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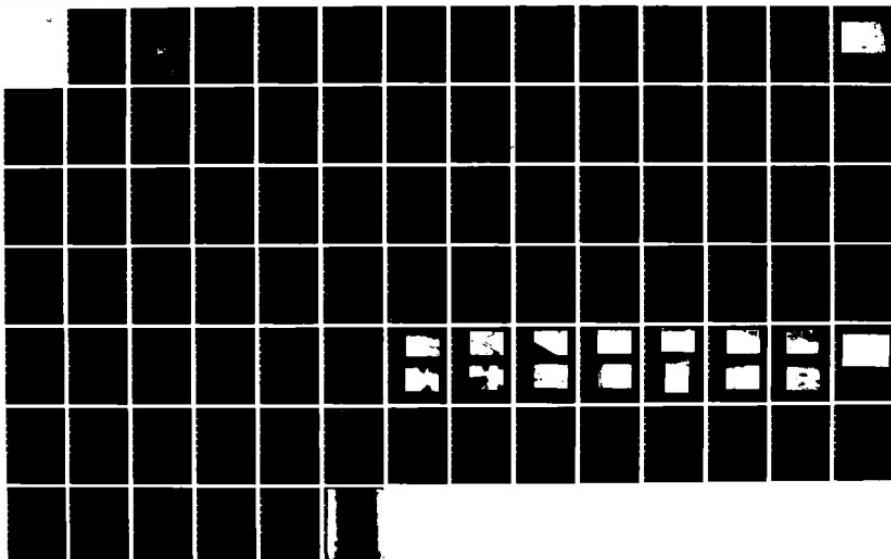
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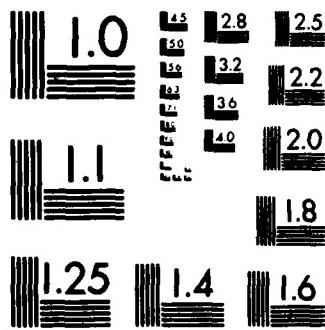
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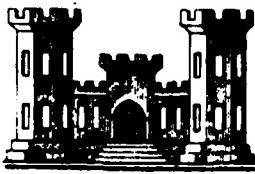
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AD-A142 585

LOWER HOUSATONIC RIVER BASIN
WATERBURY, CONNECTICUT

MAD RIVER DAM
CT 00030

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM



DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

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19. KEY WORDS (Continue on reverse side if necessary and identify by block number) DAMS, INSPECTION, DAM SAFETY, Mad River, Lower Housatonic River Basin, Waterbury Conn.		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Mad River Dam is a stone fill concretefaced dam about 300 ft. long, with a downstream earth embankment and a 60 ft. long central concrete spillway section. The maximum structural height of this dam is 31 ft. A new 3 ft. high concrete parapet wall has been constructed on top of the existing dam. An earthen dike was constructed at the same time, about 190 ft. in length, along the right side of the reservoir. Mad River Dam was used to provide an industrial water supply to the Mattatuck Manufacturing Co. The reservoir has a storage volume of 110 acre-ft. and the size classification is thus small. A breach of the dam could affect the Fairlawn East apartment complex, about 500 ft. downstream of the dam.		



DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION. CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

REPLY TO
ATTENTION OF
NEDED

MAY 15 1980

Honorable Ella T. Grasso
Governor of the State of Connecticut
State Capitol
Hartford, Connecticut 06115

Dear Governor Grasso:

Inclosed is a copy of the Mad River Dam Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. This report is presented for your use and is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. A brief assessment is included at the beginning of the report. I have approved the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is a vitally important part of this program.

A copy of this report has been forwarded to the Department of Environmental Protection, the cooperating agency for the State of Connecticut.

Copies of this report will be made available to the public, upon request, by this office under the Freedom of Information Act. In the case of this report the release date will be thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Environmental Protection for your cooperation in carrying out this program.

Sincerely,

MAX B. SCHEIDER

Colonel, Corps of Engineers
Division Engineer

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MAD RIVER DAM

CT 00030

LOWER Housatonic RIVER BASIN

WATERBURY, CONNECTICUT

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT

Identification No.: CT 00030
Name of Dam: Mad River Dam
Town: Waterbury
County and State: New Haven, Connecticut
Stream: Mad River
Date of Inspection: 28 October, 1979

BRIEF ASSESSMENT

Mad River Dam (AKA Homestead Avenue Dam) is a stone fill concrete-faced dam about 300 feet long, with a downstream earth embankment and a 60-foot long central concrete spillway section. The maximum structural height of this dam is 31 feet. A new 3-foot high concrete parapet wall has been constructed on top of the existing dam (1977). An earthen dike was constructed at the same time, about 190 feet in length, along the right side of the reservoir.

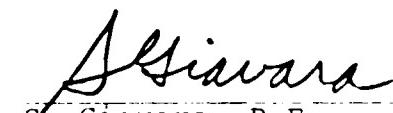
Mad River Dam was used to provide an industrial water supply to the Mattatuck Manufacturing Company. The reservoir has a storage volume of 110 acre-feet and the size classification is thus small. A breach of the dam could affect the Fairlawn East apartment complex, about 500 feet downstream of the dam, along with the urban residential properties (about 50 homes) near the Mad River between Hamilton Avenue and Connecticut Interstate Highway I-84. With the possibility of some loss of life and the probability of excessive economic losses, the dam has been classified as having a high hazard potential.

The dam was judged to be in fair condition. Possible settlement of the crest was noted. The horizontal and vertical alignment of the dam is good. Erosion was noted adjacent to spillway wing walls. Considerable erosion of the downstream slope on the left (east) side of the dam was noted, and trespassing on the slopes was also observed. Boulders and rocks have been placed at the toe and on the downstream slope to the left of the spillway. Sizeable trees are growing along the downstream toe on the right (west) side of the dam. The spillway weir is in generally good condition, with minor spalling noted. The stone masonry training walls are in good condition.

The spillway is not adequate to pass the 1/2 PMF test flood outflow without overtopping the dam and dike. The test flood would overtop the dam by about 0.5 feet. The spillway would pass about 87 percent of the test flood outflow without overtopping the dam.

Within one year of receipt of the Phase I Inspection Report, the owner should obtain the services of a qualified registered engineer to perform the following: 1) investigate the possible existence of seepage underneath the boulders strewn along the left side of the dam and design corrective measures, if needed; 2) design procedures for repairing the large erosion channels on the downstream slope along the left side of the dam; 3) design procedures for clearing trees and brush from the embankment section of the dam and the downstream toe area; and 4) inspect spillway section under "no flow" condition and 5) repair or replace footbridge, as required; and 6) perform detailed hydrologic and hydraulic investigations to determine the need for and means of increasing project discharge capacity and to provide such means as the engineer designs.

The owner should also carry out the following operational and maintenance procedures: 1) establish grassy vegetation, or other erosion-resistant protection, on the downstream slope of the embankment section at the right side of the dam; 2) maintain the area within 30 feet downstream from the toe of the dam free of trees and brush; 3) remove trees and brush from the downstream channel and for a distance of 25 feet on either side of the channel for a distance of 100 feet downstream of the dam; 4) engage a qualified Registered Professional Engineer to make a comprehensive inspection of the dam once a year; 5) establish a formal surveillance program for use during and immediately after heavy rainfall and also a flood warning plan to follow in case of floodflow conditions or imminent dam failure; and 6) operate blow off to ensure the continued ability to regulate the water surface for maintenance purposes.



S. Giavara, P.E.
President

Registered, Ct. 7634

This Phase I Inspection Report on Mad River Dam has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.

Armand Mantesian

ARAMAST MANTESIAN, MEMBER
Geotechnical Engineering Branch
Engineering Division

Carney M. Terzian

CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division

Richard J. DiBuono

RICHARD DIBUONO, CHAIRMAN
Water Control Branch
Engineering Division

APPROVAL RECOMMENDED:

Joe B. Fryar
JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

The Phase I Investigation does not include an assessment of the need for fences, gates, no-trespassing signs, repairs to existing fences and railings and other items which may be needed to minimize trespass and provide greater security for the facility and safety to the public. An evaluation of the project for compliance with OSHA rules and regulations is also excluded.

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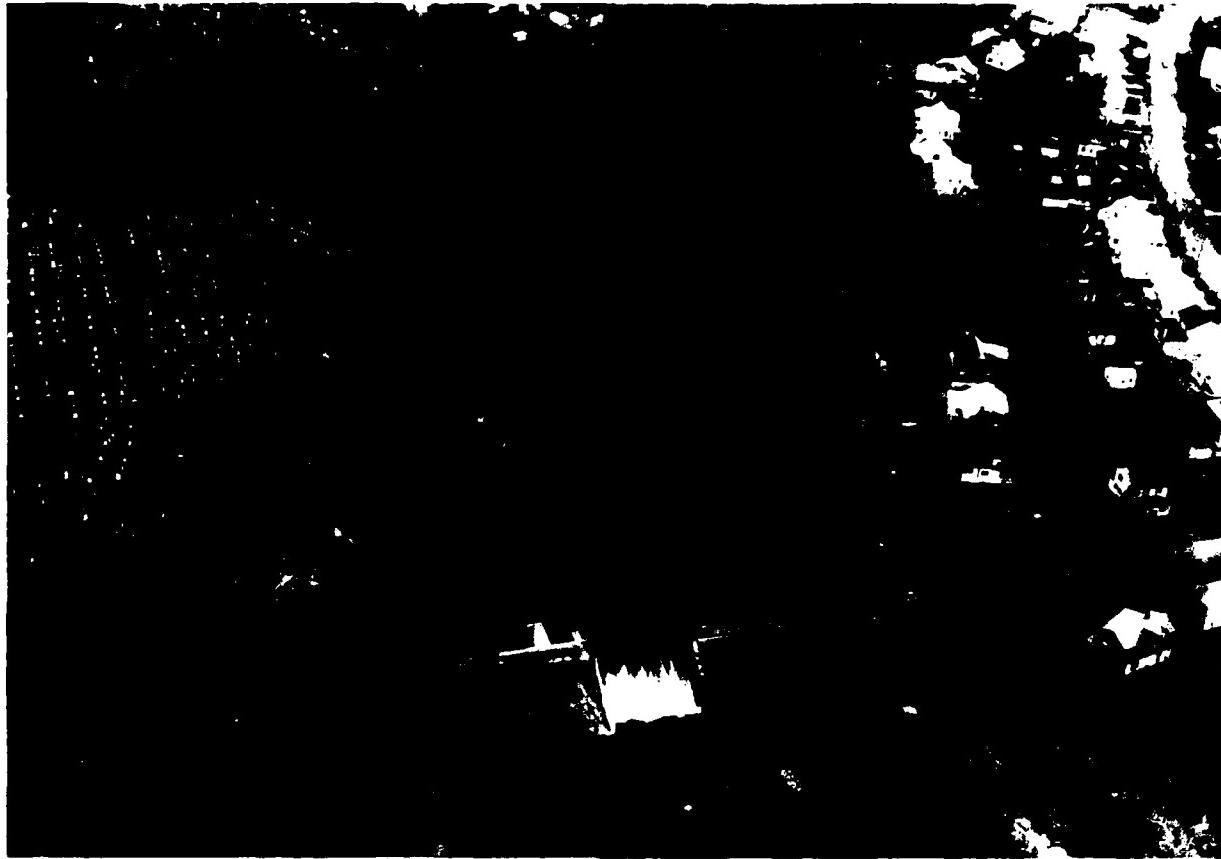
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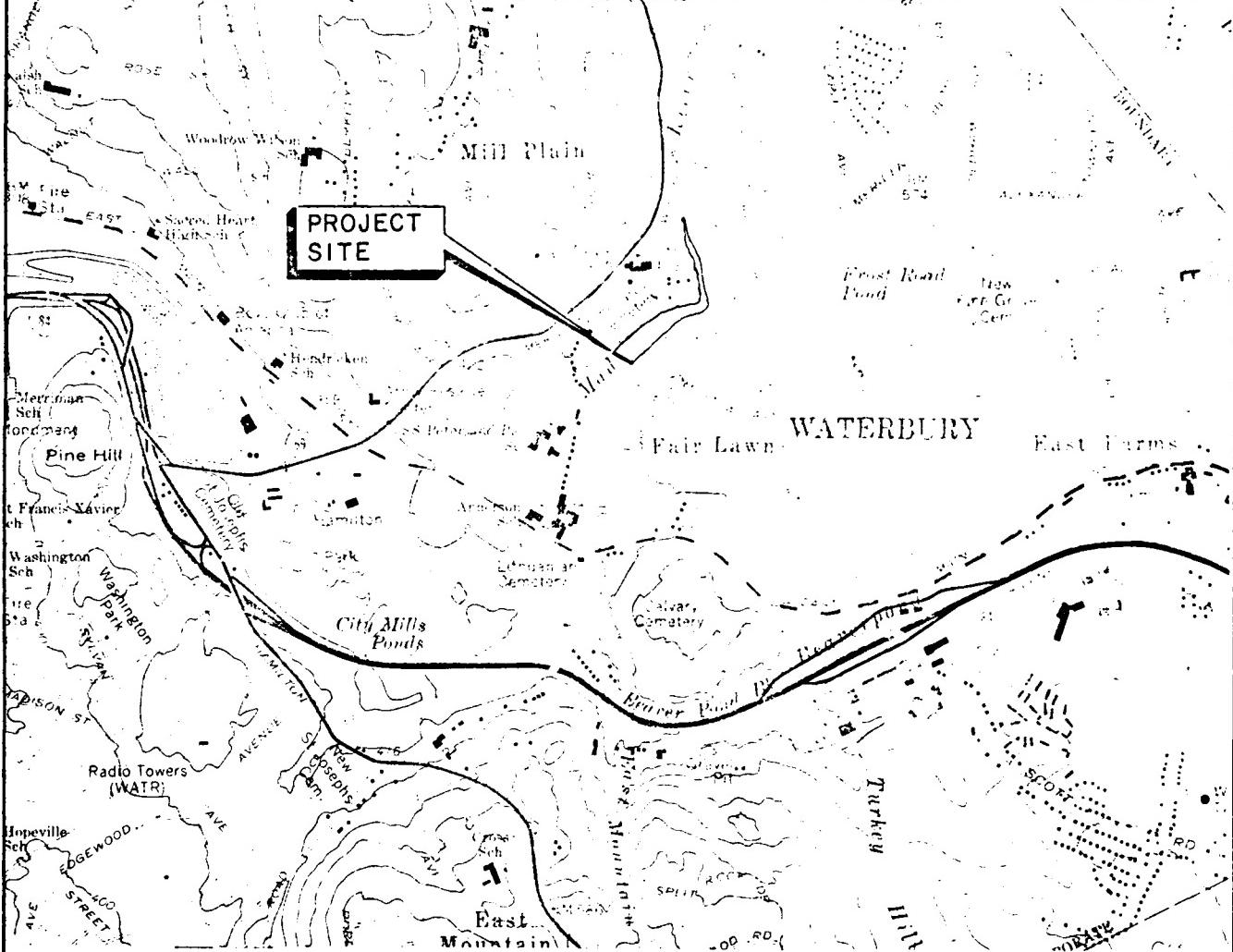
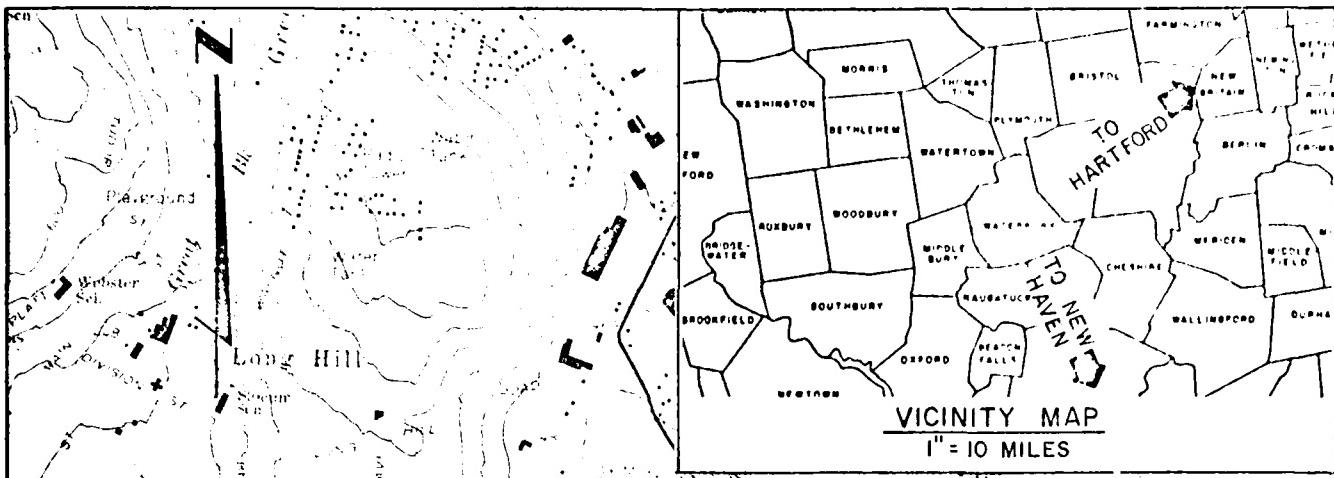
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<u>Appendix</u>	<u>Description</u>
A	INSPECTION CHECKLIST
B	ENGINEERING DATA
C	PHOTOGRAPHS
D	HYDROLOGIC AND HYDRAULIC COMPUTATIONS
E	INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS



Overview Photo: Mad River Dam



MAD RIVER DAM LOCATION MAP

WATERBURY, CONNECTICUT

SCALE IN FEET

2000 1000 0 2000

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT
MAD RIVER DAM - CT 00030

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL:

a. Authority. Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a national program of dam inspection through the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Flaherty Giavara Associates, P.C. has been retained by the New England Division to inspect and report on selected dams in the State of Connecticut. Authorization and notice to proceed was issued to Flaherty Giavara Associates, P.C. under a letter of 19 October 1979 from William E. Hodgson, Jr., Colonel, Corps of Engineers. Contract No. DACW33-80-C-0001 has been assigned by the Corps of Engineers for this work.

b. Purpose.

- 1) Perform technical inspection and evaluation of non-federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-federal interests.
- 2) Encourage and assist the States to initiate quickly effective dam safety programs for non-federal dams.
- 3) To update, verify and complete the National Inventory of Dams.

1.2 DESCRIPTION OF PROJECT:

a. Location. The Mad River Dam is located in the City of Waterbury, Connecticut approximately 4000 feet north of Interstate Route 84 off Homestead Avenue. The reservoir is shown on U.S.G.S. Topographic Map "Waterbury, Connecticut" at a latitude of $41^{\circ}32'56''$ and a longitude of $73^{\circ}00'24''$. The Location Map on page vi shows the location of the structure.

b. Description of Dam and Appurtenances. The dam is a concrete faced stone masonry structure with a downstream earthen embankment. A concrete spillway 60 feet in length is located near the center of the dam. To the left (east) of the spillway a 3 foot high concrete parapet wall has been constructed on top of

the masonry wall and ties into an existing stone wall. On the right (west) side of the spillway a similar concrete parapet wall has been constructed extending to an earthen dike located along the western side of the reservoir. The maximum structural height of this dam is 31 feet. The concrete parapet wall elevation is 111.0 feet. The top width is 1.25 feet and the base width is 3.0 feet. These 3 foot high parapet walls have a vertical downstream face and an upstream face slope of 1 horizontal to 1.7 vertical. The upstream concrete face of the dam begins at elevation 108 and extends to the reservoir surface at a slope of 1.25 horizontal to 1.0 vertical. The downstream embankment section has a grassed slope of 2:1.

Appurtenant structures consist of a spillway, outlet works and a bank run gravel dike. The concrete spillway has a crest elevation of 102 feet and is 60 feet in length. The downstream face slopes from the crest to elevation 80+ feet. The outlet works consists of an unknown sized conduit which passes under the west side of the dam. Two valve stems are located on the upstream side of the dam. The conduit outlets through a masonry structure on the downstream side of the dam. The dike is 192 feet in length located along the west bank of the reservoir with a north-south orientation. The top of dike elevation is at 111.0 feet with a top width of 2 feet and 2 horizontal to 1 vertical side slopes. This dike joins the concrete parapet wall at the right abutment.

c. Size Classification. Mad River Dam Reservoir has a storage volume of 110 acre-feet and a dam height of 31 feet. Storage of less than 1,000 acre-feet and height less than 40 feet classifies this dam in the "small" category according to guidelines established by the Corps of Engineers.

d. Hazard Classification. The dam is classified as having a "high" hazard potential. A review of the downstream conditions indicated that the number of dwellings in the probable impact area is about 50. High value industrial and commercial properties are located approximately two miles downstream of the dam and excessive economic loss would result from dam failure.

e. Ownership. The ownership of this dam at present is subject to dispute. John Errichetti Associates, 34 Prospect Street, Waterbury, Connecticut, phone no. 756-4685, claims present ownership and has been the recipient of past correspondence from the Connecticut Department of Environmental Protection (D.E.P.) relative to dam safety and maintenance. However, contained within Connecticut DEP files is legal correspondence which claims that the owner of the dam and others along the river is the Mad River Company.

f. Operator. The previous owner of the dam was Mattatuck Manufacturing Company, 20 East Main Street, Waterbury, Connecticut. This company has maintained responsibility for the day to day

operation of this dam. Operator - Gilbert Bouton - 756-4661.

g. Purpose of Dam. Previously the dam was used to provide an industrial water supply to the Mattatuck Manufacturing Company. The dam provides limited flood control but serves no other known purpose at the present time.

h. Design and Construction History. Information regarding the original design and construction of this dam is not available. In July of 1977 dam improvements were implemented by the John Errichetti Company of Waterbury, Connecticut. These improvements included the construction of a concrete parapet wall over the existing stone masonry dam embankment and an earthen dike.

Construction plans for these improvements prepared in February 1974 by Joseph Adam, P.E. are available. In addition the hydraulic spillway criteria were defined in a letter dated February 20, 1974, by John Errichetti Company. These documents are included in Appendix B.

i. Normal Operation Procedure. The original water tap from the reservoir to the Mattatuck Manufacturing Company via a sub-surface conduit apparently has ceased. All river flows now pass directly over the spillway to the downstream river channel.

1.3 PERTINENT DATA:

a. Drainage Area. The drainage area to Mad River Dam is 17.4 square miles. It is characterized by flat valleys and rolling upland terrain that is well wooded. The watershed is about 7 miles in length and has a maximum width of approximately 3 1/2 miles.

b. Discharge at Dam Site.

1) The available construction plans show a conduit of unknown size under the west side of the dam. The conduit outlets through a masonry structure on the downstream side of the dam. The approximate invert elevation at the outlet is 80.0.

2) There are no known records of past floods or flood stage heights at the dam.

3) The ungated spillway capacity at the top of dam - 4860 CFS at El. 111.0.

4) The ungated spillway capacity at test flood elevation - 6930 CFS at El. 113.4.

5) The gated spillway capacity at normal pool elevation is not applicable at this dam.

- 6) The gated spillway capacity at test flood elevation is not applicable at this dam.
- 7) The total spillway capacity at test flood elevation - 6930 CFS at El. 113.4.
- 8) The total project discharge at the top of dam - 4860 CFS at El. 111.0.
- 9) The total project discharge at test flood elevation - 11,200 CFS at EL. 113.4.

c. Elevation. (Confirmed elevations from construction plans based on an assumed datum.)

1)	Streambed at toe of dam.....	80.0
2)	Bottom of cutoff.....	N/A
3)	Maximum tailwater.....	N/A
4)	Recreation pool.....	N/A
5)	Full flood control pool.....	N/A
6)	Spillway crest.....	102.0
7)	Design surcharge (Original design)	108.5
8)	Top of dam.....	111.0
9)	Test flood design surcharge.....	111.5

d. Reservoir. (Length in feet)

1)	Normal pool.....	1400
2)	Flood control pool.....	N/A
3)	Spillway crest pool.....	1400
4)	Top of dam.....	1900
5)	Test flood pool.....	1900

e. Storage. (acre-feet)

1)	Normal pool.....	56
2)	Flood control pool.....	N/A
3)	Spillway crest pool.....	56

4) Top of dam.....110

5) Test flood pool.....113

f. Reservoir Surface. (acres)

1) Normal pool.....6

2) Flood-control pool.....N/A

3) Spillway crest.....6

4) Test flood pool.....6

5) Top of dam.....6

g. Dam.

1) Type: Concrete faced stone masonry structure with downstream earthen embankment and concrete parapets. Dike along west side of reservoir.

2) Length: Dam: 300 feet. Dike: 192 feet.

3) Height: 31 feet

4) Top Width: Masonry embankment: Varies 8 to 13 feet. Parapet: 1.25 feet.

5) Side Slopes: Upstream concrete face: 1 horizontal to 1.2 vertical. Downstream embankment: Varies 1.5-2.0 horizontal to 1 vertical.

6) Zoning: Unknown

7) Impervious Core: Unknown

8) Cutoff: Unknown

9) Grout Curtain: Unknown

h. Diversion and Regulating Tunnel.

1) Type: Not applicable

2) Length: Not applicable

- 3) Closure: Not applicable
- 4) Access: Not applicable
- 5) Regulating Facilities: Not applicable
- i. Spillway.
- 1) Type: Concrete-Broad Crested
- 2) Length of weir: 60 feet
- 3) Crest elevation: 102 feet
- 4) Gates: None
- 5) U/S Channel: Reservoir
- 6) D/S Channel: Natural river channel
- j. Regulating Outlets.
- 1) Invert: 80+
- 2) Size: Unknown
- 3) Description: Conduit shown on construction plans - masonry structure at outlet.
- 4) Control Mechanism: Valve stem

SECTION 2 - ENGINEERING DATA

2.1 DESIGN:

No engineering data has been found to provide any information about the design of the Mad River Dam.

2.2 CONSTRUCTION:

A preliminary plan showing alterations and repairs for Homestead Avenue Dam (AKA Mad River Dam) dated 2-74 prepared by Joseph A. Adam, P.E. No. 9019 is the only known construction information available.

2.3 OPERATION:

Formal operational records are not available for this dam.

2.4 EVALUATION:

a. Availability. Only minimal engineering information is available for this dam.

b. Adequacy. The lack of in-depth engineering data did not allow for a definitive review. Therefore, the adequacy of this dam could not be assessed from the standpoint of reviewing design and construction data, but is based primarily on visual inspection, past performance history and sound engineering judgement.

c. Validity. There is no reason to question the validity of the available data.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS:

a. General. The dam is a stone fill, concrete faced dam, with a downstream earth embankment and a 60 foot long central concrete spillway section. A new concrete parapet wall has been constructed on top of the existing dam (1977). Possible settlement of the crest was noted in the vicinity of station 0+90. The horizontal and vertical alignment of the dam is good. Erosion was noted adjacent to spillway wingwalls. Considerable erosion of the downstream slope on the left (east) side of the dam was noted, and trespassing on the slopes was also observed. Sizeable trees are growing along the downstream toe on the right (west) side of the dam. The spillway weir is in generally good condition, with minor spalling noted. The stone masonry training walls are in good condition.

b. Dam.

1) Upstream Face - The upstream face appears to be a sloping concrete stone faced masonry wall. A new 3-ft-high concrete parapet wall has been constructed on top of the masonry wall along the right side of the dam from the spillway to the right abutment. On the left side of the spillway, the new concrete parapet wall is approximately 30 feet long and connects to a previously existing stone wall on top of the dam. The parapet wall is in good condition, with only minor spalling observed. Some efflorescence of the concrete was noted along the upstream face. (See photo no. 1 and photo no. 4.)

2) Crest - The crest of the dam is covered by an asphalt sidewalk that connects with a footbridge over the spillway (see photo no. 2). The asphalt has been patched at many locations along the downstream edge where erosion had previously undermined the asphalt.

3) Downstream Face - The downstream face is comprised of an earth embankment on both sides of the central spillway section as shown on photo no. 3. On the left side of the dam, the embankment has eroded in many locations as indicated in photo no. 5. On the left side of the dam, there is a large erosion gully on the downstream slope which is 8-ft-wide and up to 4-ft-deep in places and extends from the crest to the toe of the slope as indicated on photos no. 8 and no. 10. In addition to the extensive erosion and gullies, the slope is covered with numerous large boulders up to 4 ft in diameter as shown in photo no. 6. There is no information available indicating when and for what purpose these large boulders were placed on the slope. No seepage could be observed between the large boulders at the toe of the slope. Trees are growing on the downstream slope near the right abutment as indicated in photo no 7. Near station 1+50, there has been

considerable erosion of the downstream slope near the spillway's right training wall. Several boulders have been exposed on the slope as indicated in photo no. 9. At approximately Sta 0+90, a path has been worn bare on the downstream slope from the crest of the dam to the downstream toe. The downstream toe of the earth embankment on the right side of the spillway is covered with brush and trees as indicated in photo no. 11. There was no evidence of wet spots or seepage noted during the visual inspection. Several stumps up to 14-in.-dia. were observed on the downstream slope in the vicinity of Sta 1+10. Near the right abutment, trees up to 18-in.-dia. are growing on the slope and at the downstream toe.

4) Spillway - The downstream face of the concrete spillway is in good condition with no significant erosion of the concrete noted. Discharge over the spillway face limited inspection of this feature. The stone and mortar spillway training walls are also in good condition. Some deterioration was observed along the top of the left training wall (east side of dam) adjacent to the footbridge. There is a shallow plunge pool at the toe of the spillway, which appears to be a natural scour hole. The sides and bottom are lined with native cobbles and gravel, and are stable. The approach to the spillway is directly from the reservoir, and was clear of obstructions and free of debris.

c. Appurtenant Structures. The plans show a conduit of unknown size under the west side of the dam. Two valve stems were observed on the upstream side of the dam, west of the spillway. The handles had been removed. The outlet is through a masonry structure on the downstream side of the dam. The structure was found to be partially full of debris and the outlet pipe could not be seen. (See Photo No. 13)

d. Reservoir Area. The perimeter of the reservoir has moderate to steep slopes that are well wooded and stable (see photo no. 15). There is no evidence of slides or sloughing. The upstream end of the reservoir has significant sediment deposits that are projecting above the water level in some areas. The exposed sediments support reed growth and shrub vegetation. The probable source of sediment is the continuing urbanization of the lower watershed, and several recent earth mining projects.

e. Downstream Channel. The channel has a typical width of 30 feet and a normal flow depth of about 2 feet. It is a natural channel with wooded banks as shown in photo no. 12. The stream bed is cut into glacial till with stream deposits of sand and gravel noted. An armored bed of gravel and cobbles is present in some reaches. The channel is neither aggrading or degrading.

f. Footbridge. The metal truss members are severely deteriorated at several locations, most noticeably at the bottom chord bearing plates on the southwest and southeast corners of the bridge. Two diagonal braces between the bottom chords have rusted and failed. Several bolts at truss joints have nuts missing.

3.2 EVALUATION:

Based on visual inspection, Mad River Dam is in fair condition.

Trees are growing on the downstream slopes of the embankment section at the right and left ends of the dam and along the downstream toe of the dam. If a tree blows over and its roots are pulled out or if a tree dies and its roots rot, seepage and erosion problems may result. The trees and brush growing immediately downstream of the dam make it difficult to inspect that area adequately.

Extensive erosion and sloughing of the downstream slope has occurred on both sides of the spillway. This continued erosion could lead to future stability problems if not corrected. Boulders and rocks have been placed at the toe and on the downstream slope to the left of the spillway. These boulders prevent detection of seepage if it is occurring in this area. Also erosion of the slope as a result of surface runoff will be obscured by the presence of the stone cover.

SECTION 4 - OPERATIONAL AND MAINTENANCE PROCEDURES

4.1 OPERATIONAL PROCEDURES:

- a. General. Since the outlet structure for the dam is not operable, the water level impounded by Mad River Dam is not controlled and no formal operational procedures are followed.
- b. Description of any warning system in effect. There is no warning system of any kind in effect at the dam. There are no formal emergency operation plans in effect for lowering the water level in anticipation of severe storms.

4.2 MAINTENANCE PROCEDURES:

- a. General. Maintenance of the dam appears to be generally lacking.
- b. Operating facilities. There are no formal maintenance procedures followed for the operating facilities.

4.3 EVALUATION:

Regular operational maintenance for this dam and its appurtenances have not been developed or implemented. In view of the apparent lack of drawdown capability at the dam, it is important that the owner make arrangements to have the handles for the valve stems brought to the dam and operate the valves to ensure that the blow-off is operational.

An emergency action plan should be prepared to prevent or minimize the impact of failure. This plan should list the expedient action to be taken and authorities to be contacted.

SECTION 5 - EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

5.1 GENERAL:

The Mad River Dam is a stone fill, concrete faced dam with a downstream earth embankment and a concrete parapet wall. It has a 60 foot wide centrally located spillway. The spillway acts as a broad crested weir, and has a rounded approach face with a crest sloping in the downstream direction. A steel truss footbridge crosses the dam above the spillway, leaving a clear opening of 9.5 feet between the spillway crest and the bottom chord member. At stages above 9.0 feet, the dam would be overtopped.

The watershed area is 17.4 square miles, and is characterized by flat valleys and rolling upland terrain that is well wooded. The land use within the watershed is rural residential in the headwater areas, and mixed commercial and urban residential in the watershed areas near the dam.

The watershed includes 5 significant man-made impoundments in the headwater areas, with a total of 415 acres of water surface area. Approximately 44 percent of the watershed drains through one or more of these impoundments, and they are presumed to store a portion of the storm runoff during floods.

5.2 DESIGN DATA:

There is no available information on the hydraulic design criteria for this dam and appurtenances. The Connecticut Department of Environmental Protection retained a consultant to analyze the hydraulic capacity of the dam (see Appendix-B, letter from Mozzochi Associates dated February 23, 1972). At that time, the dam was analyzed for a storm with an average return frequency of 100 years, due to a 6 hour duration rainfall of 5.1 inches. The storm runoff was routed through the upstream impoundments, and resulted in a peak inflow of 1680 CFS. The dam would (before alterations) pass this flow with 2 feet of free board. The dam was also analyzed for a 6 hour rainfall of 7.5 inches and found to pass this flow of 3300 CFS (no free board).

In February 1974, plans were prepared by Joseph Adams, P.E. to indicate proposed revisions to the dam, and the hydraulic criteria were defined in a letter dated February 20, 1974, by John Errichetti Company (see Appendix-B). Based on these plans, a reinforced concrete parapet wall was constructed along the crest of the dam, and an earth dike constructed on the right (west) abutment to increase the allowable head at the spillway to 9.0 feet.

5.3 EXPERIENCE DATA:

No information is available on past flood experience and flood stages at the dam.

5.4 TEST FLOOD ANALYSIS:

The test flood for determining the spillway adequacy is based upon OCE guidelines. The size classification of the dam is "small," based upon a height of 31 feet and storage volume of 110 acre-feet. The hazard potential is "high," due to intense land use downstream of the dam. The spillway test flood required by OCE guidelines for this size dam and hazard potential can range from the 1/2 probable maximum flood to the probable maximum flood.

The spillway test flood selected for this project is the 1/2 PMF, due to the possibility of some loss of life and the probability of excessive economic loss due to dam failure.

The magnitude of the PMF (and 1/2 PMF spillway test flood) is based upon "Preliminary Guidance for Estimating PMF Discharges" by the New England Division, Corps of Engineers, dated December, 1977. The watershed is flat to rolling, and has significant flood-water storage areas in impoundments and on the Mad River Floodplain north of Stillson Road. The flood magnitude was based on the "flat" watershed curve. The 1/2 PMF (spillway test flood) is 5,655 CFS.

The spillway test flood was formed into a triangular hydrograph with a peak inflow of 5,655 CFS and a duration of 37.5 hours. The duration was selected so that the triangular hydrograph would contain the same volume of water as the estimated storm runoff.

The hydrograph was routed through the reservoir using a computer program based on stage-storage and stage-discharge data. The reservoir was assumed to be full and level with the spillway prior to the storm event. The discharge flows are based upon a spillway coefficient of 3.0 and a length of 60 feet.

The maximum spillway capacity is 4860 CFS at a stage of 9 feet (just prior to overtopping). The results of the flood routing procedure indicate that the spillway test flood outflow would be reduced to 5,610 CFS at flood stage of elevation 111.5 (0.5 feet above the crest of the dam). The spillway can pass 87 percent of the spillway test flood outflow.

5.5 DAM FAILURE ANALYSIS:

The downstream impact of a dam failure was analyzed using the COE "Rule of Thumb Guidance for Estimating Downstream Dam Failure Hydrographs" dated April, 1978.

Based upon an assumed breach width equal to 40% of the dam's width at mid-height, the peak flood flow leaving the dam would be 18,250 CFS, with an initial depth of 12.5 feet downstream of the dam. The flood flow rate and flow depth decreases rapidly as the flood moves downstream, due to a broad valley and the low storage volume in the reservoir.

The probable impact areas, which would experience damage, include the Fairlawn East, apartment complex, 500 feet downstream of the dam where approximately 15 units would be flooded to depths of 1 to 3 feet (above first floor level) and 15 units would be subjected to 3 to 6 feet of flooding (see photo No. 14) and urban residential properties (about 20 dwellings) near the Mad River between Hamilton Avenue and Connecticut Interstate I-84 where flooding would be about 3 feet.

Industrial and commercial properties are located approximately two miles downstream of the dam. Both Hamilton Avenue and Interstate Route 84 could experience flooding and accompanying economic loss.

SECTION 6 - EVALUATION OF STRUCTURAL STABILITY

6.1 VISUAL OBSERVATIONS:

The visual inspection indicates the following areas of potential problems.

a. Seepage and erosion of the downstream slope may be occurring beneath the large boulders which are located to the left of the spillway section.

b. Trees growing on the downstream slopes of the embankment section and along the toe at both the left and right ends of the dam. In addition, trees and brush overhang the discharge channel and are growing in the channel in some places.

6.2 DESIGN AND CONSTRUCTION DATA:

Original design and construction data are lacking and are not sufficient to access the stability of the dam and the safety must be judged primarily from visual observations.

6.3 OPERATING RECORDS:

No operating records pertinent to the structural stability of the dam are available.

6.4 POST-CONSTRUCTION CHANGES:

A plan indicating repairs and alterations to the Mad River Dam (AKA Homestead Avenue Dam) prepared for John Errichetti Co. dated 2/74 shows repairs to the bitumen concrete walkway, construction of a 3-ft-high reinforced concrete parapet wall and construction of an earth embankment (dike). The changes constructed in 1977 have not adversely affected stability or structural integrity of the dam. No other record of post-construction changes is available.

6.5 SEISMIC STABILITY:

Mad River Dam is in Seismic Zone 1 and, in accordance with recommended Phase I guidelines of the Corps of Engineers, does not warrant seismic analysis.

SECTION 7 - ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 DAM ASSESSMENT:

a. Condition. The visual examination indicates that Mad River Dam is in fair condition and functioning adequately. The major concerns with respect to the long-term performance of the dam are:

- 1) Erosion of the downstream slopes on the right and left sides of the dam.
- 2) Presence of large boulders on the downstream slope of the dam to the left of the spillway training wall which obscures seepage that may be occurring.
- 3) Trees growing on the downstream face of the dam.

The capacity of the spillway is inadequate to pass the PMF test flood outflow of 11,200 CFS without overtopping the dam and dike. The test flood would overtop the dam by about 2.4 ft. The spillway is adequate to pass about 43 percent of the test flood outflow without overtopping the dam and dike.

b. Adequacy of Information. The information available was very limited, and thus the assessment of the condition of the dam is based primarily on the visual inspection, past operational performance of the structure and sound engineering judgement.

c. Urgency. The recommendations and remedial measures presented in Section 7.2 and 7.3 should be implemented within one year of receipt of this Phase I inspection report by the Owner.

7.2 RECOMMENDATIONS:

The following should be performed under the direction of a qualified registered engineer:

- a. Investigate the possible existence of seepage underneath the boulders strewn along the left side of the dam and design corrective measures, if needed.
- b. Design procedures for repairing the large erosion channels on the downstream slope along the left side of the dam.
- c. Design procedures for clearing trees and brush from the embankment section of the dam and the downstream toe area.
- d. Inspect spillway section under "no flow" condition.
- e. Repair and/or replace footbridge as required.

f. Perform detailed hydrologic and hydraulic investigations to determine the need for and means of increasing project discharge capacity and to provide such means as the engineer designs.

7.3 REMEDIAL MEASURES:

a. Operating and Maintenance Procedures. The Owner should:

- 1) Establish grassy vegetation, or other erosion-resistant protection, on the downstream slope of the embankment section at the right side of the dam.
- 2) Maintain the area within 30 feet downstream from the toe of the dam free of trees and brush.
- 3) Remove trees and brush from the downstream channel and for a distance of 25 feet on either side of the channel for a distance of 100 feet downstream of the dam.
- 4) Engage a Qualified Registered Engineer to make a comprehensive inspection of the dam once a year.
- 5) Establish a formal surveillance program for use during and immediately after heavy rainfall and also a flood warning plan to follow in case of floodflow conditions or imminent dam failure.
- 6) Operate blow-off to ensure the continued ability to regulate the water surface for maintenance purposes.

7.4 ALTERNATIVES:

There are no practical alternatives to the recommendations contained in Sections 7.2 and 7.3.

APPENDIX A

INSPECTION CHECK LIST

INSPECTION CHECK LIST

PARTY ORGANIZATION

PROJECT Mad River Dam
Homestead Avenue
Waterbury, CT

DATE Oct. 23, 1979

TIME 1300

WEATHER Clear, 60°F

W.S. ELEV. 440± U.S. DN.S.

PARTY:

1. R. Smith, FGA - Project Manager

2. J. MacBroom, FGA - Hydraulics/Hydrology

3. R. Murdock, GEI - Geotechnical

4. _____

5. _____

PROJECT FEATURE

INSPECTED BY

REMARKS

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

PERIODIC INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: Mad River Dam DATE: Oct. 23, 1979

AREA EVALUATED	CONDITIONS
<u>DAM EMBANKMENT</u>	
Crest Elevation	111 (<u>449+</u> MSL)
Current Pool Elevation	102 (<u>440+</u> MSL)
Maximum Impoundment to Date	Unknown.
Surface Cracks	None.
Pavement Condition	Asphalt and grass, in fair condition.
Movement or Settlement of Crest	Possible settlement of crest in vicinity of Sta 0+90.
Lateral Movement	None observed.
Vertical Alignment	Good.
Horizontal Alignment	Good.
Condition at Abutment and at Concrete Structures	Erosion adjacent to spillway wingwalls.
Indications of Movement of Structural Items on Slopes	None.
Trespassing on Slopes	Several worn paths.
Sloughing or Erosion of Slopes or Abutments	Considerable erosion of slopes along left side of dam.
Rock Slope Protection - Riprap Failures	Concrete upstream face.
Unusual Movement or Cracking at or near Toes	None observed.
Unusual Embankment or Downstream Seepage	None observed.
Piping or Boils	None.
Foundation Drainage Features	None.
Toe Drains	None.
Instrumentation System	None.
Vegetation	Sizeable trees along downstream toe on right side of dam.

PERIODIC INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: Mad River Dam

DATE: Oct. 23, 1979

AREA EVALUATED	CONDITIONS
<u>DIKE EMBANKMENT</u>	
Crest Elevation	111 ($449 \pm$ MSL)
Current Pool Elevation	102 ($440 \pm$ MSL)
Maximum Impoundment to Date	Unknown
Surface Cracks	
Pavement Condition	
Movement or Settlement of Crest	Some settlement noted
Lateral Movement	None observed
Vertical Alignment	Good
Horizontal Alignment	Good
Condition at Abutment and at Concrete Structures	Some erosion and settlement in vicinity of junction with right parapet wall.
Indications of Movement of Structural Items on Slopes	None
Trespassing on Slopes	None
Sloughing or Erosion of Slopes or Abutments	None observed
Rock Slope Protection - Riprap Failures	No slope protection
Unusual Movement or Cracking at or near Toes	None observed
Unusual Embankment or Downstream Seepage	None
Piping or Boils	None
Foundation Drainage Features	None
Toe Drains	None
Instrumentation System	None
Vegetation	Grass on U.S. and D.S. slopes

PERIODIC INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: Mad River Dam DATE: Oct. 23, 1979

AREA EVALUATED	CONDITIONS
<u>OUTLET WORKS - INTAKE</u> <u>CHANNEL AND INTAKE</u> <u>STRUCTURE</u>	Not applicable.
a. Approach Channel	
Slope Conditions	
Bottom Conditions	
Rock Slides or Falls	
Log Boom	
Debris	
Condition of Concrete Lining	
Drains or Weep Holes	
b. Intake Structure	
Condition of Concrete	
Stop Logs and Slots	

PERIODIC INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: Mad River Dam

DATE: Oct. 23, 1979

AREA EVALUATED	CONDITIONS
<u>OUTLET WORKS - CONTROL TOWER</u>	None.
a. Concrete and Structural	
General Condition	
Condition of Joints	
Spalling	
Visible Reinforcing	
Rusting or Staining of Concrete	
Any Seepage or Efflorescence	
Joint Alignment	
Unusual Seepage or Leaks in Gate Chamber	
Cracks	
Rusting or Corrosion of Steel	
b. Mechanical and Electrical	
Air Vents	
Float Wells	
Crane Hoist	
Elevator	
Hydraulic System	
Service Gates	
Emergency Gates	
Lightning Protection System	
Emergency Power System	
Wiring and Lighting System in Gate Chamber	

PERIODIC INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: Mad River Dam DATE: Oct. 23, 1979

AREA EVALUATED	CONDITIONS
<u>OUTLET WORKS - TRANSITION AND CONDUIT</u> General Condition of Concrete Rust or Staining on Concrete Spalling Erosion or Cavitation Cracking Alignment of Monoliths Alignment of Joints Numbering of Monoliths	None.

PERIODIC INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: Mad River Dam

DATE: Oct. 23, 1979

AREA EVALUATED	CONDITIONS
<u>OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL</u> General Condition of Concrete Rust or Staining Spalling Erosion or Cavitation Visible Reinforcing Any Seepage or Efflorescence Condition at Joints Drain Holes Channel Loose Rock or Trees Overhanging Channel Condition of Discharge Channel	Not applicable.

PERIODIC INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: Mad River Dam

DATE: Oct. 23, 1979

AREA EVALUATED	CONDITIONS
<u>OUTLET WORKS - SPILLWAY WEIR</u> <u>APPROACH AND DISCHARGE</u> <u>CHANNELS</u>	
a. Approach Channel General Condition Loose Rock Overhanging Channel Trees Overhanging Channel Floor of Approach Channel	Underwater.
b. Weir and Training Walls General Condition of Concrete Rust or Staining Spalling Any Visible Reinforcing	Weir in generally good condition, some spalling noted. Stone training walls in good condition. None.
c. Discharge Channel General Condition Loose Rock Overhanging Channel Trees Overhanging Channel Floor of Channel Other Obstructions	None noted. Fair. None. Trees on banks on both sides of channel. Natural channel bottom. Channel contains downed trees, brush and some tires.

PERIODIC INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: Mad River Dam

DATE: Oct. 23, 1979

AREA EVALUATED	CONDITIONS
<u>OUTLET WORKS - SERVICE BRIDGE</u>	
a. Superstructure	
Bearings	Poor condition.
Anchor Bolts	Some nuts missing.
Bridge Seat	
Longitudinal Members	Rusting.
Under Side of Deck	
Secondary Bracing	Bottom braces broken, east side.
Deck	Lumber and plywood, w/3" bituminous concrete, some deterioration noted.
Drainage System	
Railings	
Expansion Joints	
Paint	
b. Abutment & Piers	
General Condition of Concrete	Good.
Alignment of Abutment	
Approach to Bridge	
Condition of Seat and Backwall	

APPENDIX B

ENGINEERING DATA

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

NAME OF DAM MAD RIVER DAM
I.D. NO. CT-00030

ITEM	REMARKS
AS-BUILT DRAWINGS	NONE EXIST
REGIONAL VICINITY MAP	AVAILABLE FROM U.S.G.S.
CONSTRUCTION HISTORY	NONE AVAILABLE
TYPICAL SECTIONS OF DAM	FIELD MEASUREMENTS
OUTLETS - Plan	NOT AVAILABLE
- Details	NOT AVAILABLE
- Constraints	UNKNOWN
- Discharge Ratings	NONE AVAILABLE
RAINFALL/RESERVOIR RECORDS	UNAVAILABLE
DESIGN REPORTS	NONE
GEOLOGY REPORTS	NONE
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	LIMITED DATA - DEP FILES NONE NONE
MATERIALS INVESTIGATIONS BORINGS RECORDS LABORATORY FIELD	NONE NONE NONE

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

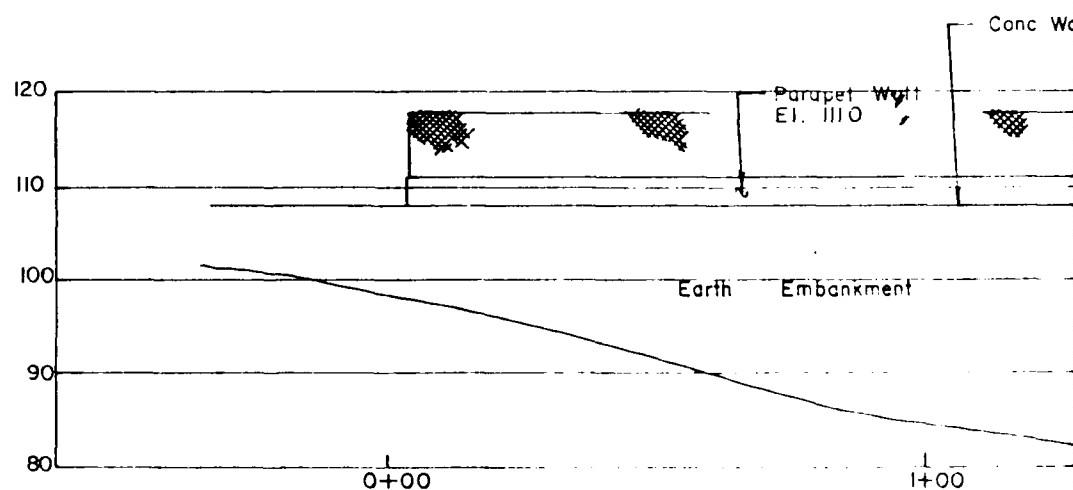
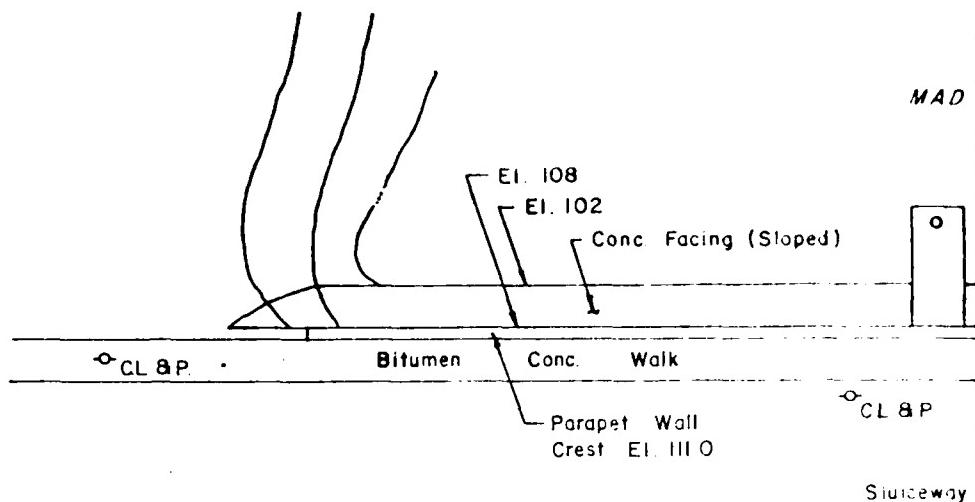
NAME OF DAM MAD RIVER DAM

I.D. NO. CT-00030

ITEM	REMARKS
POST-CONSTRUCTION SURVEYS OF DAM	YES - DEP FILES
BORROW SOURCES	UNKNOWN
MONITORING SYSTEMS	NONE
MODIFICATIONS	PLANS - SHOW MODIFICATIONS TO DAM CONSTRUCTED - 1977
HIGH POOL RECORDS	NONE AVAILABLE
POST-CONSTRUCTION ENGINEERING STUDIES AND REPORTS	NONE
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	NONE NONE
MAINTENANCE OPERATION RECORDS	NONE
SPILLWAY PLAN	FROM PLANS
SECTIONS	FROM PLANS
DETAILS	UNKNOWN
OPERATING EQUIPMENT PLANS & DETAILS	UNKNOWN

N

MAD

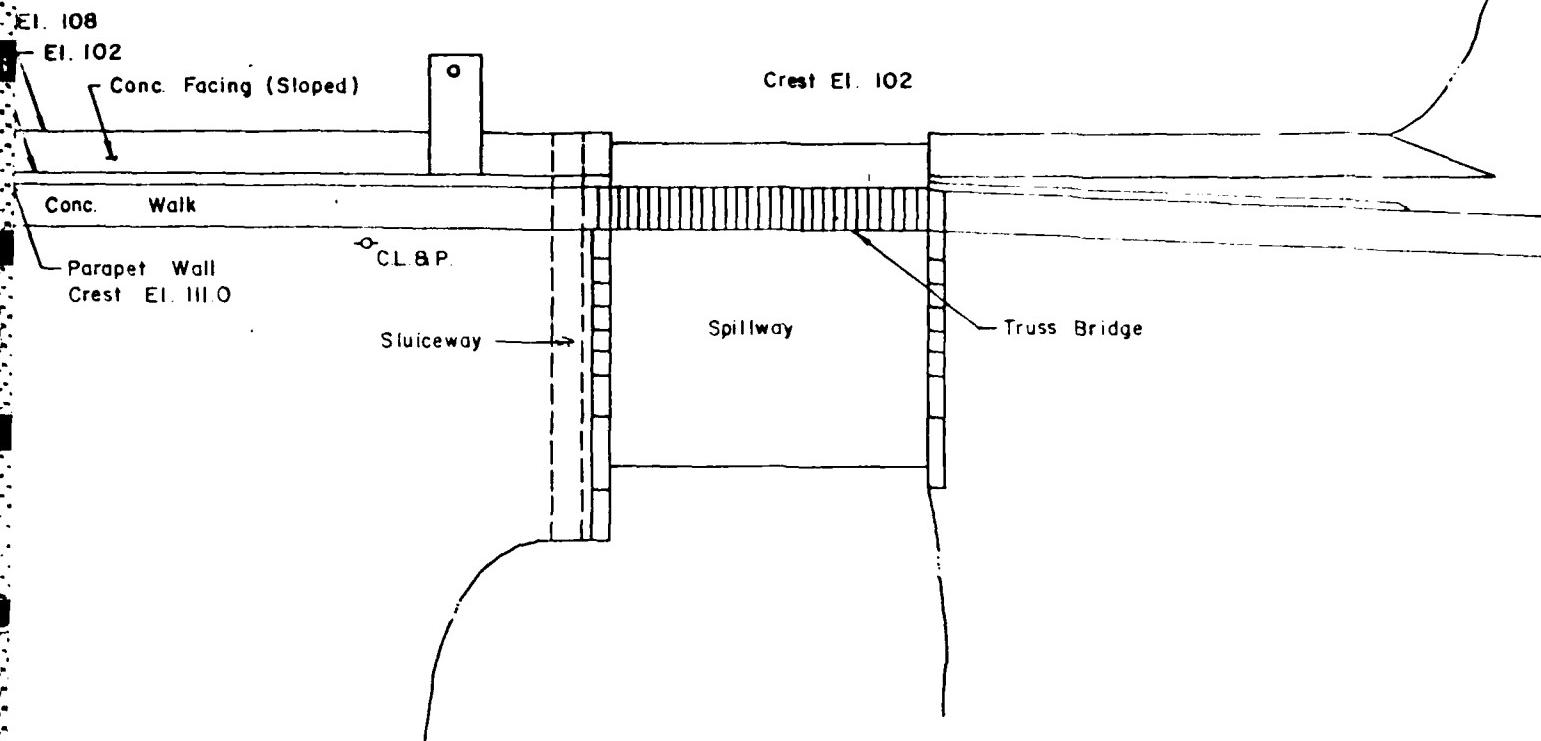


DOWNSTR

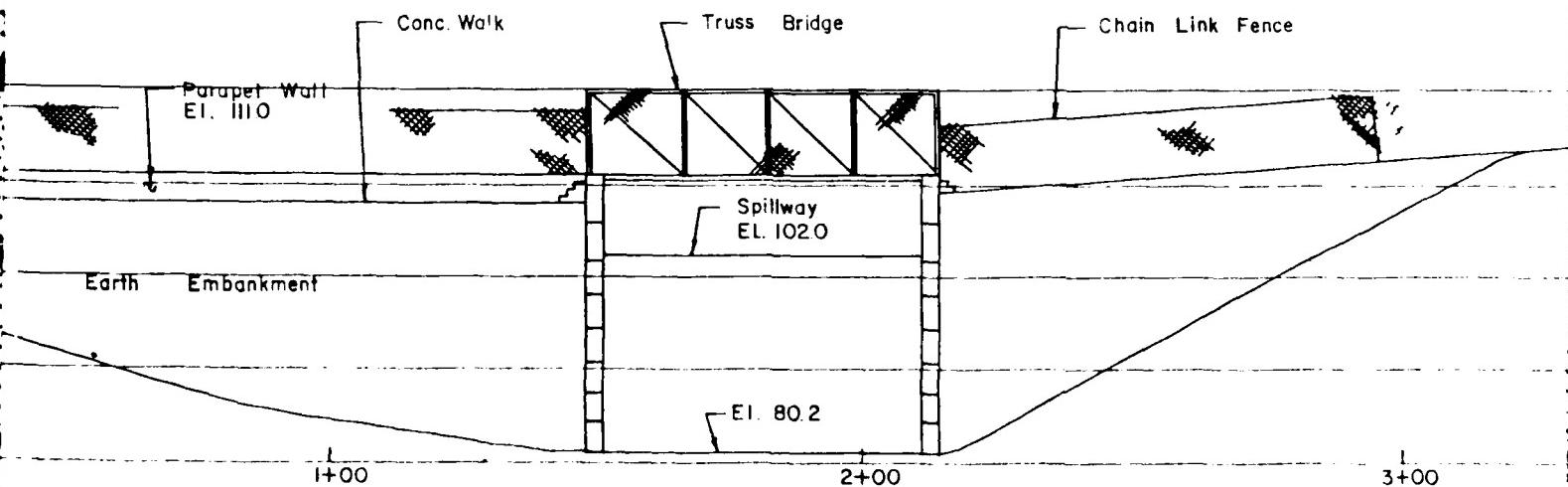
(1)

(2)

MAD RIVER



PLAN
NTS

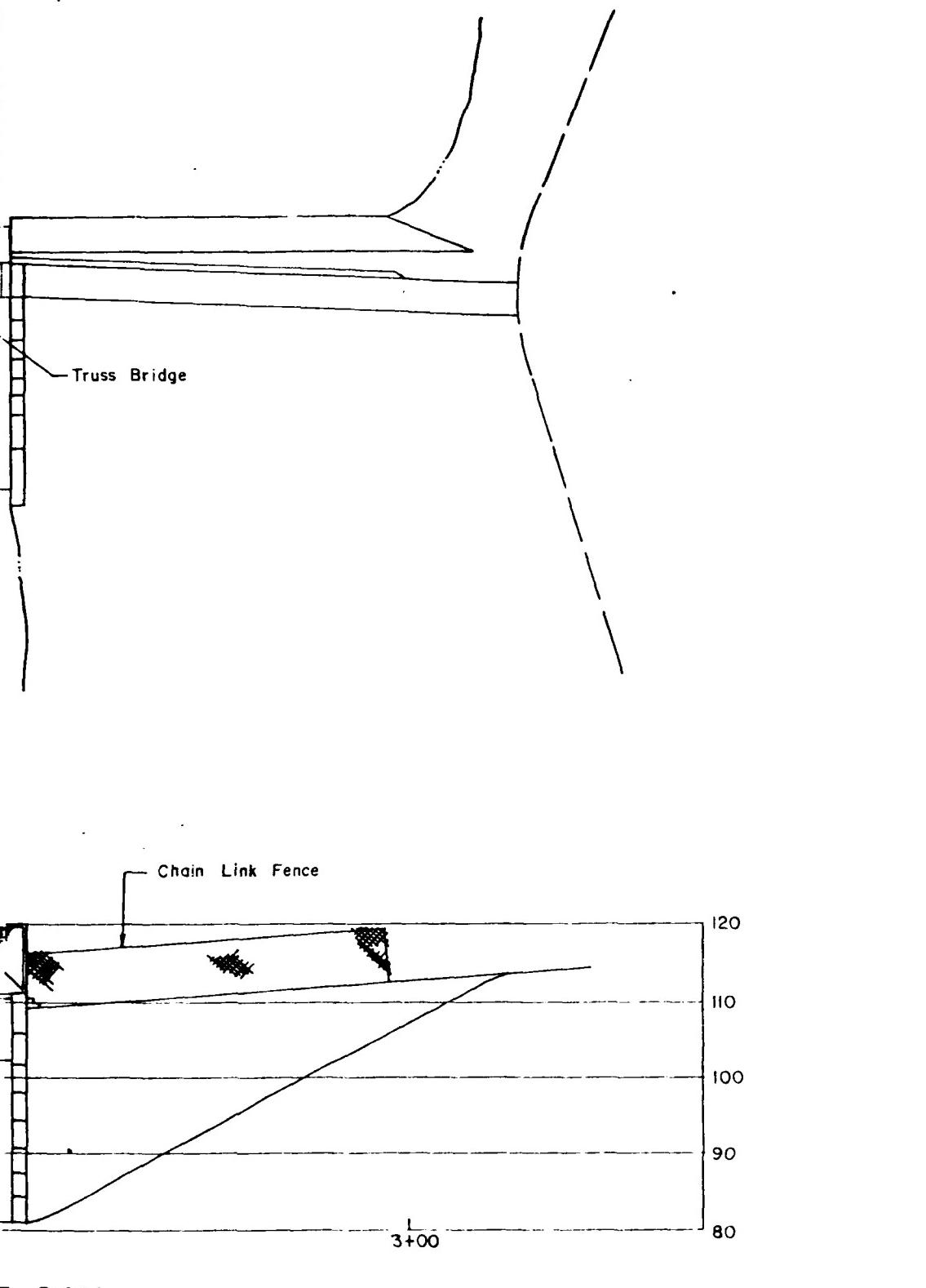


DOWNTSTREAM ELEVATION OF DAM
NTS

MAD

(2)

(3)

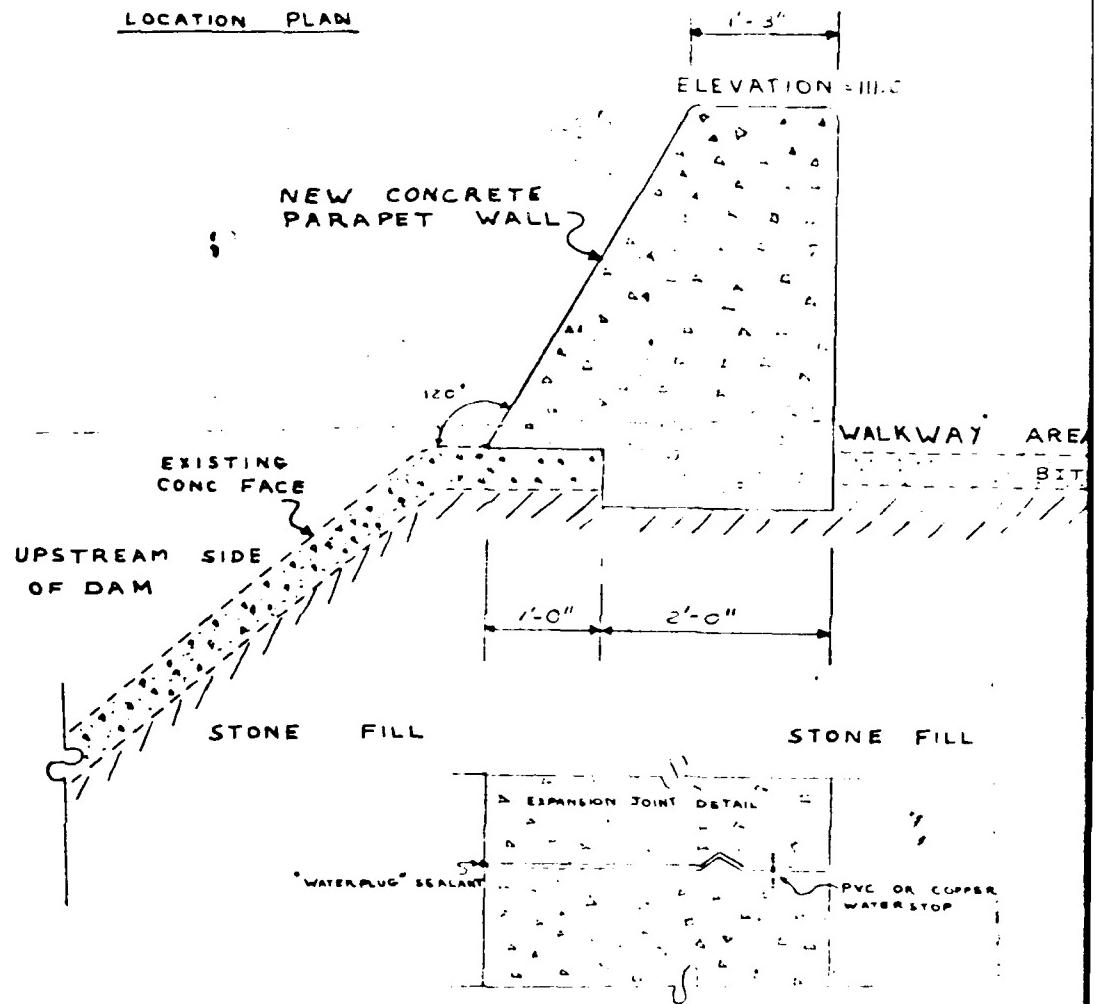


F DAM

MAD RIVER DAM



LOCATION PLAN



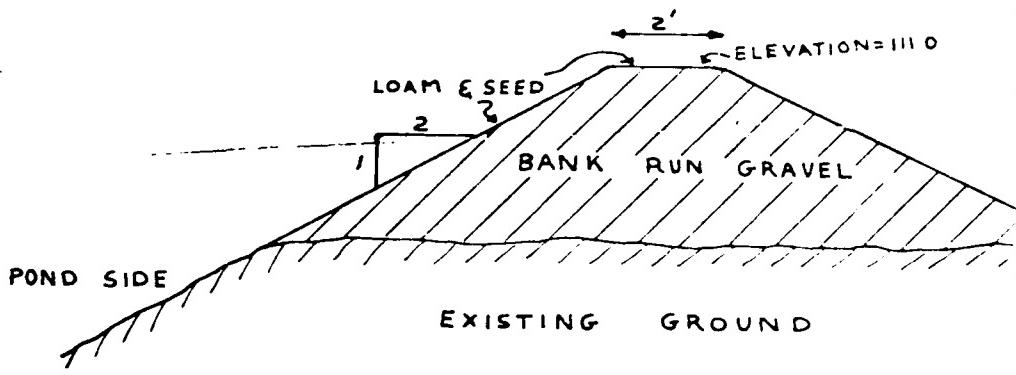
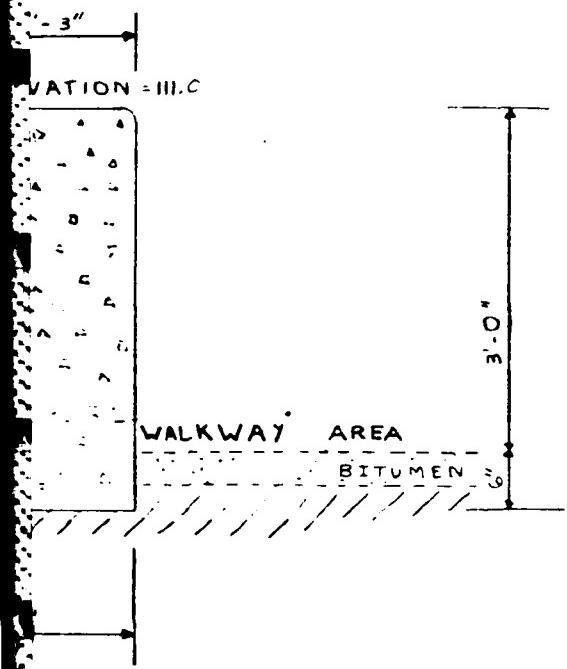
CROSS SECTION B-B

NEW CONCRETE PARAPET WALL

SCALE 1" = 1'-0"

1. EXPANSION JOINT IN CONCRETE EVERY 20 FEET
2. FOR BONDING NEW CONCRETE TO CURED CONCRETE
 - a. SANDBLAST OLD SURFACE DOWN TO SOUND CONCRETE AND REMOVE DUST
 - b. BRUSH OR SPRAY ON AN EPOXY ADHESIVE
 - c. PLACE NEW CONCRETE
3. WATERPROOF ALL JOINTS WITH "WATERPLUG" BRAND SEALANT

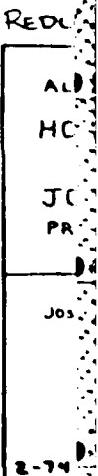
(1)



CROSS SECTION A-A

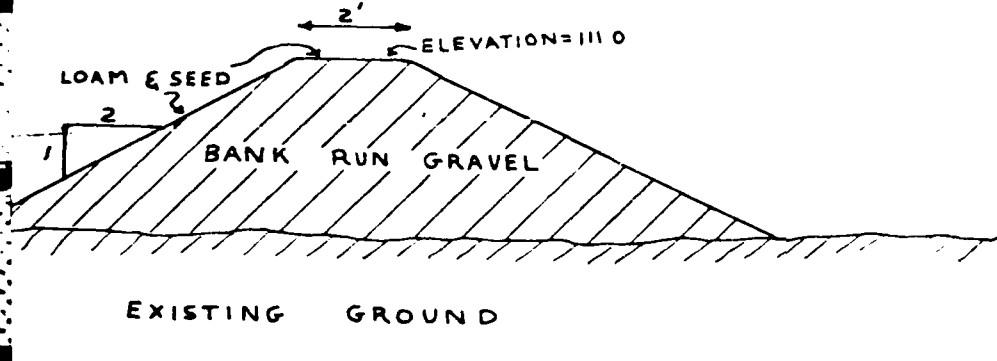
NEW EARTH EMBANKMENT

SCALE $\frac{1}{2}'' = 1'-0''$



①

②



CROSS SECTION A-A

NEW EARTH EMBANKMENT

SCALE $\frac{1}{8}$ " = 1'-0"

REDUCED NOT TO SCALE

PRELIMINARY PLAN ALTERATIONS & REPAIRS HOMESTEAD AVE. DAM JOHN ERRICCHETTI CO. PROSPECT ST. WATERBURY, CT.

JOSEPH A ADAMS PE NO 4015

1



MAD

DOWNSTR

ELEVATION 80'

BACK SLOPE

60'

SPILLWAY

HOMESTEAD

OLD STONE WALL
ELEVATION 100'

NEW ALUMINUM
REINFORCED
PARAPET WALL

ELEVATION 102'

EXISTING TRUSS BRIDGE
CURRENT CLEARANCE OVER SPILLW
IS 70'. RAISE BRIDGE TO A 100'
CLEARANCE. ADJUST WALKWA
TO GENTLY SLOPE UP TO NEW
BRIDGE ELEVATION

AVENUE

ANCHOR

LAKEVIEW

20' ROW
MAD RIVER
CITY OF WATERBURY
INTERCEPTOR

UPSTREAM

P

①

MAD RIVER

DOWNTREAM

ELEVATION 80.0

BACK SLOPE

SPILLWAY

CREST OF SPILLWAY ELEVATION 80

EXISTING TRUSS BRIDGE
CURRENT CLEARANCE OVER SPILLWAY
IS 70'. RAISE BRIDGE TO A 100'
CLEARANCE. ADJUST WALKWAY
TO GENTLY SLOPE UP TO NEW
BRIDGE ELEVATION

UPSTREAM

POND

FILL IN ERODED AREA

AVENUE

REPAIR WALKWAY

BITUMEN CONCRETE WALKWAY

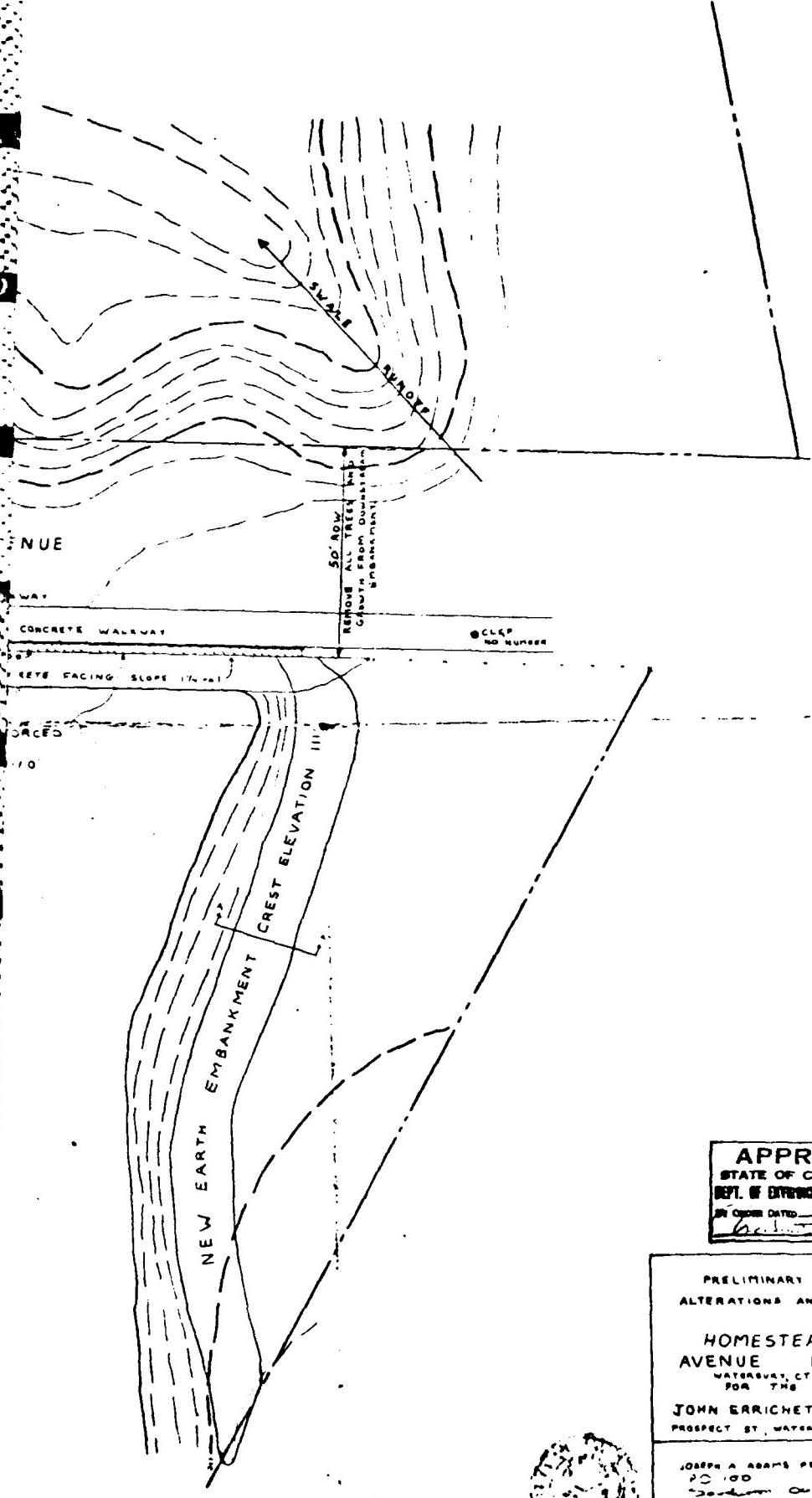
ELEVATION 80.8
REINFORCED CONCRETE FACING SLOPE 1/4 - 6
ELEVATION 80.5

NEW 3' HIGH REINFORCED
PARAPET WALL
CREST ELEVATION 111.0

NEW EARTH EMBANKMENT

CREST ELEVATION 111.

REDUCED Not To Scale



APPROVED
STATE OF CONNECTICUT
DEPT. OF ENVIRONMENTAL PROTECTION
IN ORDER DATED 6/1/1977

PRELIMINARY PLAN
ALTERATIONS AND REPAIRS

HOMESTEAD
AVENUE DAM
WATERBURY, CT
FOR THE
JOHN ERRICHETTI CO.
PROSPECT ST., WATERBURY, CT

JOSEPH A. ADAMS PE MM
SC 100
Dowdall & Associates
SCALE 1:1000
8-79

2

MEMO SUMMARY OF DEP FILE DATA

Name: Homestead Avenue Dam

Location: Homestead Avenue, Waterbury

Owner: John Errichetti Associates, Waterbury

Date: May 5, 1977

2/23/72 - Consultant inspection report indicates need for minor maintenance and increased spillway capacity.

3/20/72 - Letter from O'Brien to John Errichetti Associates requesting plans be submitted for additional spillway capacity.

3/28/74 - Construction permit issued by Bampton. Work to be completed within one year.

10/16/75 - Construction permit renewed by Gill. Work to be completed within one year.

10/16/75 - Letter from Galgowski to Errichetti stating the construction work approved must be completed within one year or matter will be referred to the Attorney General.

10/30/75 - Letter from Attorney Peterson stating repairs should be made by a Loretta Boutin since she has water rights. He agrees, however, that Errichetti does have title to the dam.

11/04/76 - Letter to Errichetti renewing permit for one year. Work must be completed by November 4, 1977.

Homestead Avenue Dam is located on Mad River in the south central portion of the City of Waterbury. It creates a pond of 7.4 acres with a contributing drainage area of 7.1 square miles. The dam is made of concrete with earth fill downstream. It is approximately 300' in length with a 60' concrete spillway that is 25' above stream bed.

Our concern is that the dam would overtop during the design flood. Additional spillway capacity must be provided and some minor "dressing up" of the embankment performed.

Failure of this dam could affect roadways and a number of dwellings downstream.

Copy to E. Bel 2/24/72

MOZZOCHI ASSOCIATES

CIVIL ENGINEERS

GLASTONBURY, CONN. 06033
217 HEBRON AVENUE
PHONE 633-9401

PARTNERS

JOHN LUCHS, JR.
STUART J. BECKERMAN

February 23, 1972

PROVIDENCE, R. I. 02903
169 WEYBOSSET STREET
PHONE 421-0420

REPLY TO: Glastonbury

William H. O'Brien, III - Civil Engineer
Department of Environmental Protection
Water & Related Resources
State Office Building
Hartford, Connecticut 06115

**WATER & RELATED
RESOURCES
RECEIVED**

FEB 23 1972

ANSWERED _____

REFERRED _____

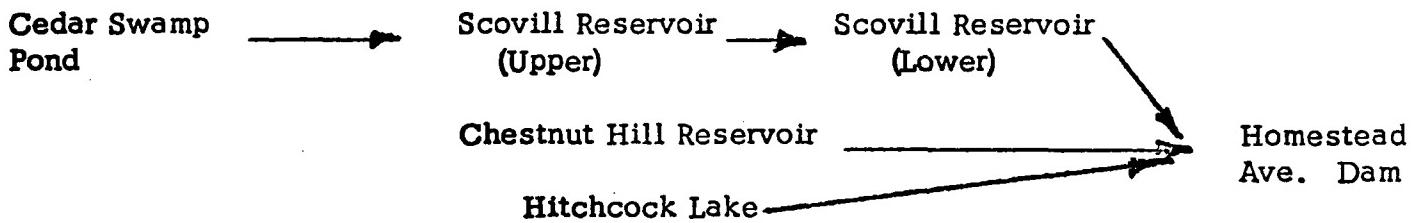
FILED _____

Re: Homestead Ave. Dam
(John Errichetti Assoc.)
Waterbury
Our File No. 57-73-94

Dear Mr. O'Brien:

As authorized in your letter of January 27, 1972, we have inspected and evaluated the spillway capacity allowing for the storage of four large reservoirs in the up-stream drainage area.

The total watershed area for this structure is $17.4 \pm$ sq. miles, with four (4) major reservoirs upstream. The storages and releases from these independent structures, will affect the inflow of the subject dam. It was therefore necessary to determine the routed discharges from the upstream reservoirs to evaluate the inflow hydrograph. The flow pattern is as follows:



	<u>Drainage Area</u>	<u>Water Surface Area</u>
Cedar Swamp Pond	0.9 Sq. Miles	$130 \pm$ Acres
Scovill Reservoir (Upper)	7.4 Sq. Miles	$115 \pm$ Acres
Scovill Reservoir (Lower)	0.0 Sq. Miles	$5 \pm$ Acres
Chestnut Hill Reservoir	1.7 Sq. Miles	$65 \pm$ Acres
Hitchcock Lake	0.3 Sq. Miles	$100 \pm$ Acres
Homestead Ave. Dam	7.1 Sq. Miles	$6 \pm$ Acres
Total	17.4 Sq. Miles	

Flood routing studies for the reservoirs were carried out for design floods of 7.5" and 5.1"/ 6 hr storm and the results tabulated below:

Reservoir	FLOOD ROUTING STUDY				MAX. OUTFLOW Q CFS	
	SPILLWAY width ft.	MAX. WATER SURFACE depth of crest from top		FREEBOARD p=5'1" p=7'5" p=7'5"		
		p=7'5"	p=5'1"			
Cedar Swamp Reservoir	13'-0 ⁺	2'-9"	1'-1"	0'-7"	1'-8"	
Scovill Reservoir (upper)	100' & 39'6"	3'-6"	3'-6"	1'-10"	-----	
Scovill Reservoir (lower)	57' & 79'	3'-10"	3'-4"	1'-10"	0'-6"	
Chestnut Hill Lake	28'	4'-8"	2'-9"	1'-5"	1'-11"	
Hitchcock Lake	26 [±]	2' ±	0'-5"	0'-3"	1'-7"	
Homestead Ave. Dam	60' & (40" Sluice gate)	6'-0"	6'-0"	4'-0"	-----	
					2'-0"	
					45	
					20	
					1'-8"	
					2'-0"	
					3000	
					1200	
					2900	
					1100	
					450	
					160	
					25	
					10	
					3300	
					1680	

This analysis shows the Homestead Ave. Dam can pass a 100 yr. storm (5.1"/ 6 hr storm) with the desirable minimum of 2' of freeboard. Checking with a SCS "B" classification (7.5"/ 6 hr storm), no freeboard remains. (The SCS Class "B" closely approximates 35% of the probable maximum precipitation for Zone 1). The danger factor is further intensified because our calculations have assumed the 40" sluice gate is open and discharging.

Listed below are my recommendations for this dam as observed by field inspection and office calculations:

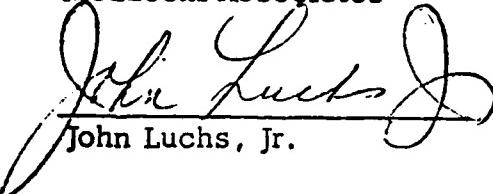
1. Provide an emergency spillway to prevent possible overtopping. It appears that the area west of the structure can be utilized for this purpose.
2. Remove all trees and growth from downstream embankment.
3. Repair wash-out of downstream embankment west of spillway and "dress-up" entire downstream embankment.
4. Divert surface run-off from streets easterly of the structure off of embankment onto natural ground.

A further recommendation is that obstructions should be placed to prevent automobiles from crossing the bridge across the spillway.

If you have any questions, please call.

Very truly yours,

Mozzochi Associates



John Luchs, Jr.

JLjr:hk



JOHN ERRICCHETTI COMPANY

prospect towers p o box 825 waterbury conn 06720 tel 7564685
real estate development & management

william f bragg vice president property management

February 20, 1974

Janice B. Goldfrank
Planning & Research
Department of Environmental Protection
State Office Building
Room 117
Hartford, Connecticut 06115

Re: Project No. 017-35053-LD WAH
BROOKFIELD II
Waterbury, Connecticut

Dear Ms. Goldfrank:

In response to your recent request to Fred Rispoli of HUD, enclosed please find the engineering design to provide additional spillway capacity for the Homestead Avenue Dam in connection with the above-captioned project.

Additional capacity was based on a design flood of 7.5"/6 hour storm and a maximum outflow of 3300 CFS as determined in the report by Mozzochi Associates dated February 23, 1972 (copy enclosed).

This additional capacity was achieved through the use of reinforced concrete parapet walls which have raised the spillway depth from the crest to the top to 9'0". This additional capacity will provide more than two feet of freeboard during a design flood of 3300 CFS as indicated below:

Reservoir -	Homestead Avenue Dam
Spillway Dimensions	-60' wide x 9'0" depth
Sluice Gate -	40"
Maximum Water Surface above crest (P=7.5"/6 hour) -	6'7"
Freeboard -	2'5"
Maximum Outflow Q CFS -	3300

This design has also included provisions to remove all trees and growth from the downstream embankment, to repair the eroded areas of the downstream embankment, and to divert surface runoff off the embankment and on to natural ground.

Janice B. Goldfrank,
Planning & Research

-2-

February 20, 1974

Thanking you for your prompt attention to this matter so we can receive the necessary environmental clearance; if further information is required, please let me know.

Yours very truly,

William F. Bragg

William F. Bragg

Vice President

WFB/cmm

enclosures

cc: Fred Rispoli
James Sakonchick

APPENDIX C

PHOTOGRAPHS

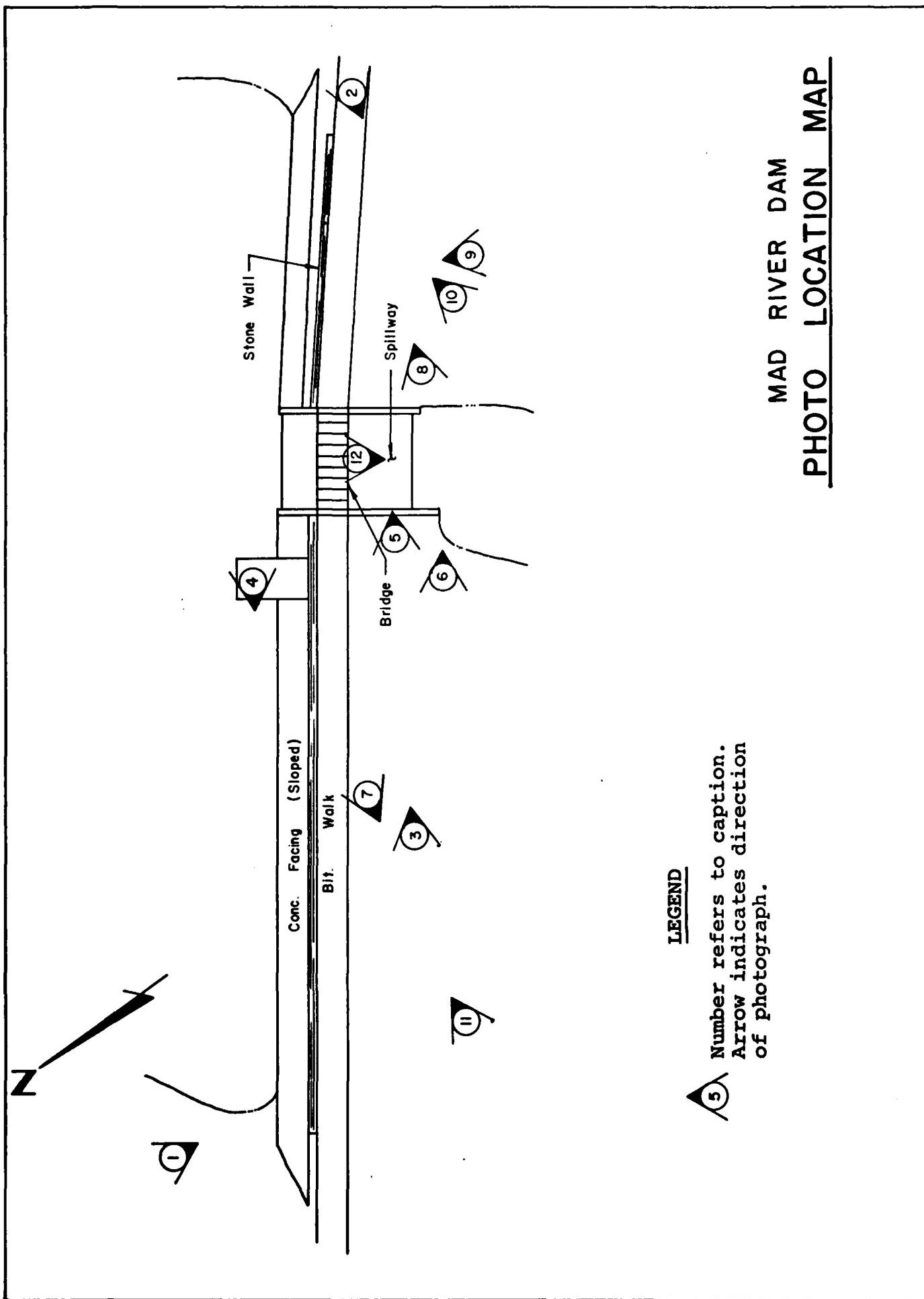




PHOTO #1: Upstream face of dam from right abutment.



PHOTO #2: Crest and downstream slope from left abutment.

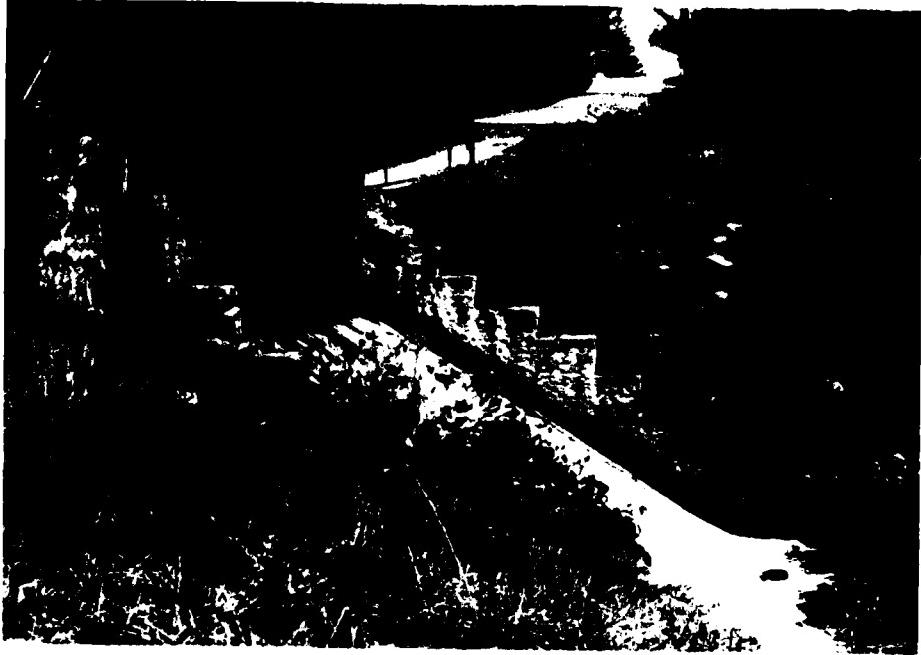


PHOTO #3: Spillway and downstream slope from right (West) side of dam.



PHOTO #4: Upstream face of dam looking towards right abutment. Note 3-foot parapet wall on top of concrete face and earth embankment at right side of dam.

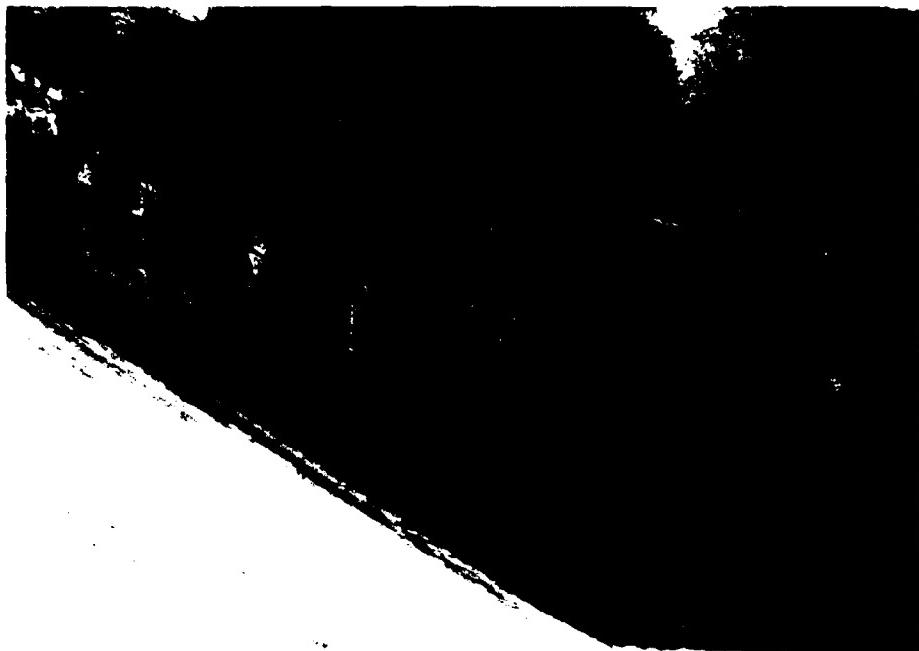


PHOTO #5: Downstream slope of embankment along the left side of dam.



PHOTO #6: Large pile of boulders on the downstream slope and at the toe of the embankment to the left of the spillway training wall.

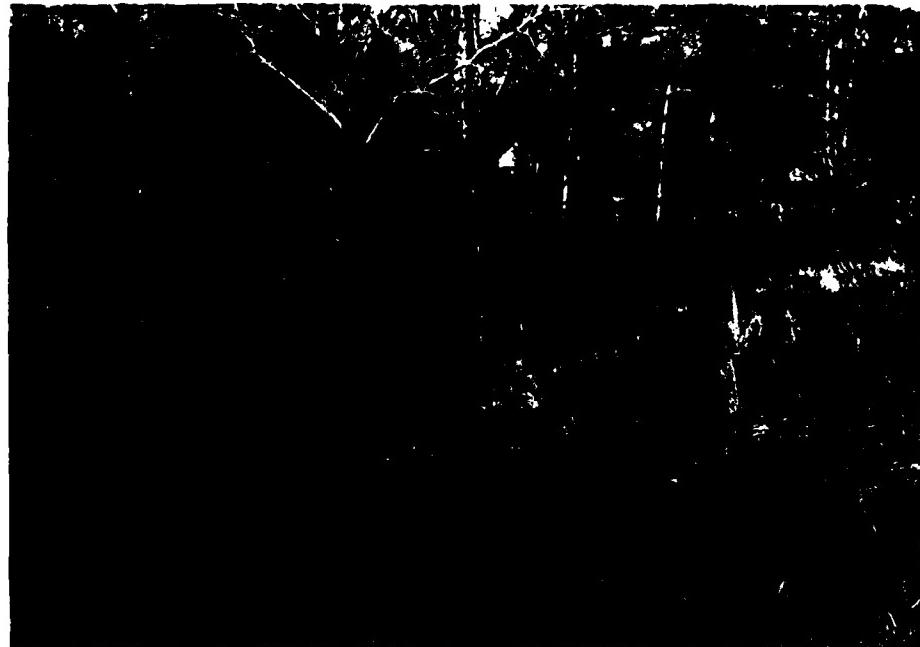


PHOTO #7: Downstream slope of the embankment section looking toward the contact with the right abutment.

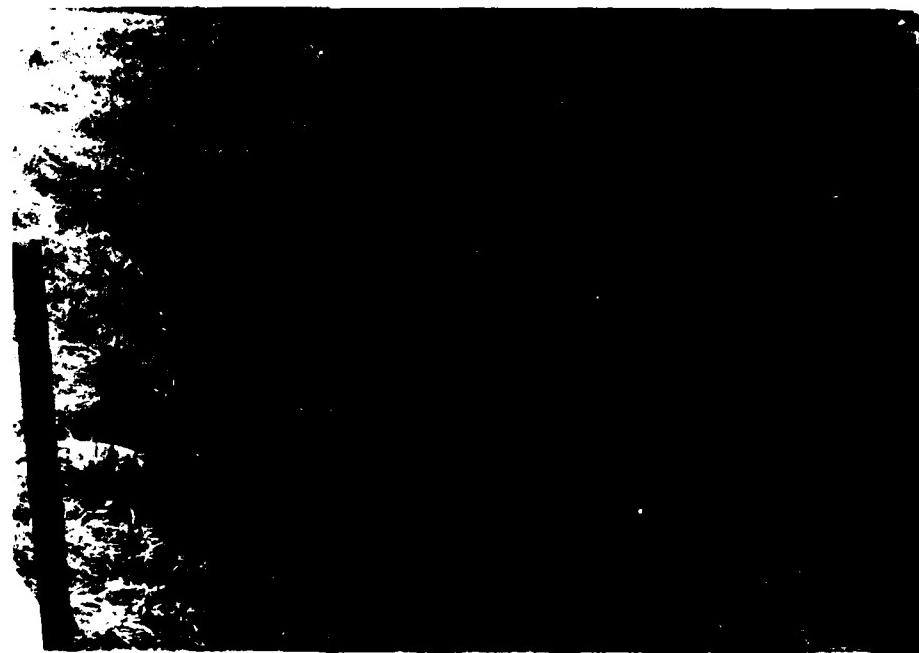


PHOTO #8: Large erosion channel on the downstream face to the left of spillway channel.



PHOTO #9: Rock fill on the downstream slope of the embankment.

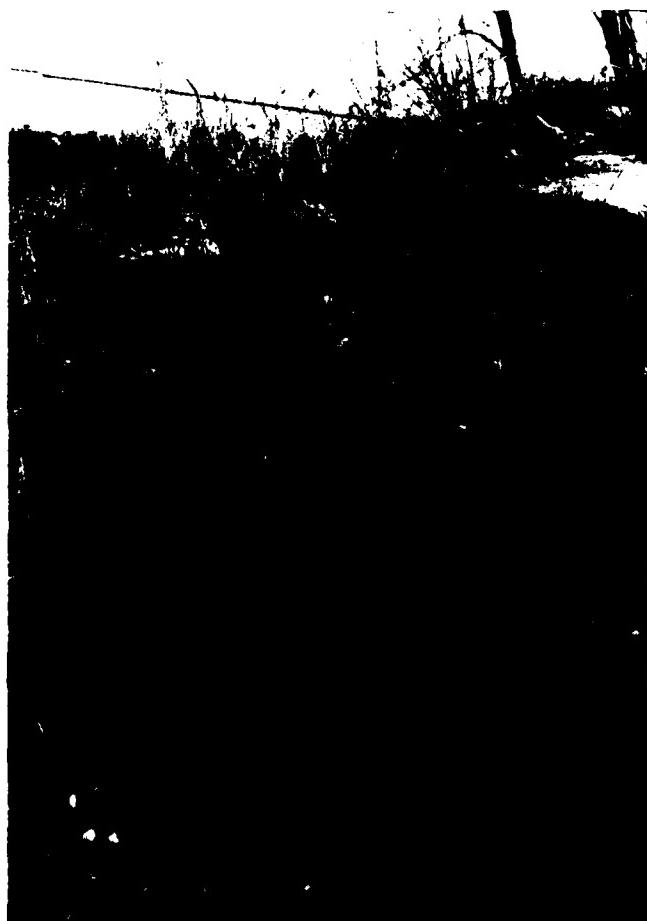


PHOTO #10: Erosion channel on the downstream face. (Channel is up to 5 ft. wide and 3 ft. deep.)

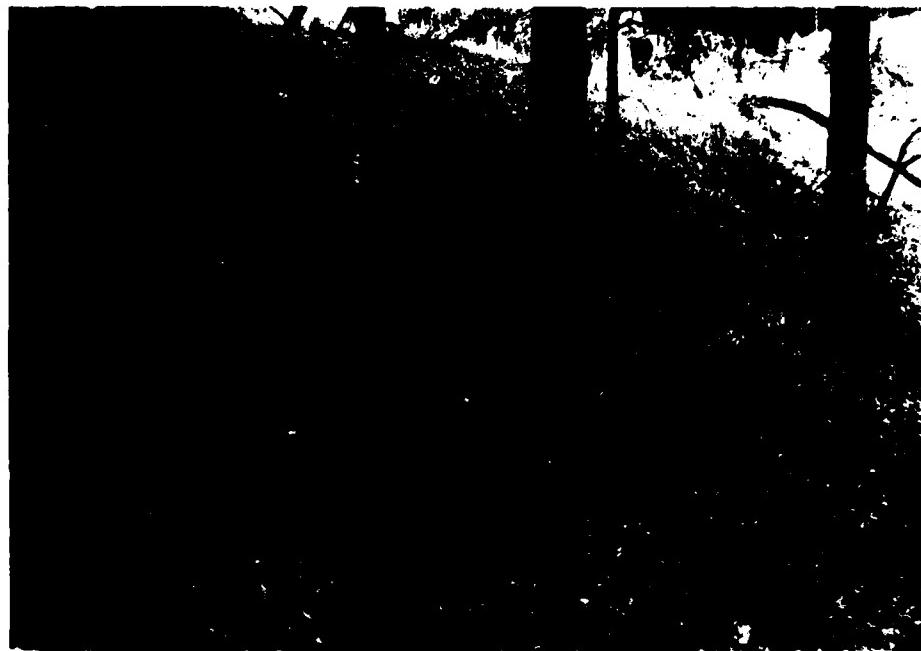


PHOTO #11: Looking toward spillway channel along toe of dam.



PHOTO #12: Downstream spillway channel.



Photo #13: Blow-Off Outlet Structure



Photo #14: Apartment Buildings in Downstream Impact Area



Photo #15: Reservoir Area

APPENDIX D

HYDROLOGIC AND HYDRAULIC
COMPUTATIONS

PROJECT MAD RIVER DAM
WATERBURY, CT



FLAHERTY-GIAVARA ASSOCIATES
ENVIRONMENTAL DESIGN CONSULTANTS
ONE COLUMBUS PLAZA, NEW HAVEN, CONN 06510/203/789-1260

SHEET NO. 1 OF 17
BY JGM DATE 11/20/79
CHK'D. BY PR DATE 12/20/79
Rev. 3/4/80 JGM

DETERMINATION OF SPILLWAY TEST FLOOD*

A. SIZE CLASSIFICATION

Storage Volume (Ac.-Ft.) 110

Height of Dam (Ft.) 31

Size Classification SMALL

B. HAZARD POTENTIAL CLASSIFICATION

<u>Category</u>	<u>Loss of Life</u>	<u>Economic Loss</u>
Low	None expected	Minimal
Significant	Few	Appreciable
High	<u>More than few</u>	<u>Excessive</u>

Hazard Classification HIGH

C. HYDROLOGIC EVALUATION GUIDELINES

<u>Hazard</u>	<u>Size</u>	<u>Spillway Design Flood</u>
Low	Small	50 to 100-Year Frequency
	Intermediate	100-Year Frequency to 1/2 PMF
	Large	1/2 PMF to PMF
Significant	Small	100-Year Frequency to 1/2 PMF
	Intermediate	1/2 PMF to PMF
	Large	PMF
<u>High</u>	<u>Small</u>	<u>1/2 PMF</u> to PMF
	Intermediate	PMF
	Large	PMF

Spillway Test Flood 1/2 PMF

*Based upon "Recommended Guidelines for Safety Inspection of Dams" Department of the Army, Office of the Chief of Engineers, November 1976.

PROJECT MAD RIVER DAM
WATERBURY, CT



FLAHERTY-GIAVARA ASSOCIATES
ENVIRONMENTAL DESIGN CONSULTANTS
ONE COLUMBUS PLAZA, NEW HAVEN, CONN 06510/203/789-1260

SHEET NO. 2 OF 17
BY JGM DATE 11/20/79
CHK'D BY P.B. DATE 12/20/79
REV. 3/4/80

DETERMINATION OF THE
MAXIMUM PROBABLE FLOOD (MPF)

A. Drainage Area in Square Miles 17.4

B. Watershed Characteristic: Flat & Coastal

Rolling

Moutainous

C. M.P.F. in CFS/Square Mile,* 650

M.P.F. = (CFS/Square Mile) x (Area in Square Miles)

$$\frac{17.4}{ } \times \frac{650}{ } = \frac{11310 \text{ CFS}}{}$$

$$\frac{1}{2} \text{ PMF} = \frac{1}{2} (11310 \text{ CFS}) = 5655 \text{ CFS}$$

*Based upon the figure "Maximum Probable Flood Peak Flow Rates"
U.S. Army Corps of Engineers, December 1977.



RAINFALL

DESIGN CONDITION 7.5" RAIN IN 6 HOURS

PMP = 24" FOR 6 HR DURATION, 10 SQ MILES

REDUCTION FACTOR FOR 17.4 SQ MILES IS 0.94

EFFECTIVE PMP_E = 24" × 0.94 = 22.56 IN.

$$\frac{\text{DESIGN RAIN}}{\text{PMP}} = \frac{7.5"}{22.5"} = 0.33 = 33\% \text{ OF PMP}$$

RUNOFF

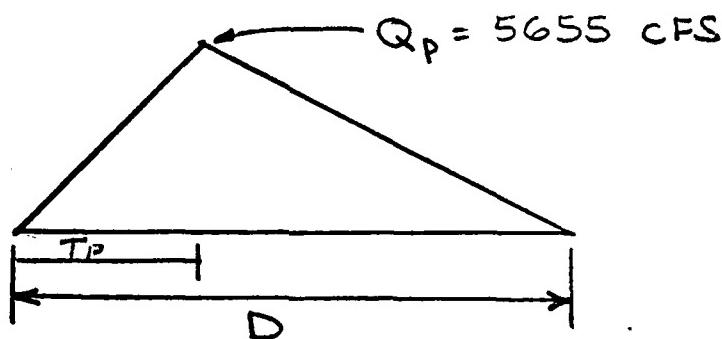
BASED ON AN ASSUMED CN VALUE OF 75 (FOR GLACIAL TILL SOILS), RUNOFF FOR THE PMP IS 19.0 INCHES (FIG A-4, DESIGN OF SMALL DAMS). RUNOFF FOR THE 1/2 PMP IS ≈ 1/2 (19 INCHES) = 9.5 INCHES

SPILLWAY Test Flood RUNOFF = 9.5"

$$\begin{aligned} \text{VOLUME OF RUNOFF} &= (9.5" / 12" / \text{FT}) \times 17.4 \text{ mi}^2 \times 640 \text{ AC/mi}^2 \\ &= 8816 \text{ AC-FT} \end{aligned}$$

HYDROGRAPH

A TRIANGULAR HYDROGRAPH IS TO BE USED FOR THE ROUTING OF THE TEST FLOOD THROUGH THE RESERVOIR. PEAK FLOW EQUALS 5655 CFS, SET DURATION OF RUNOFF SO AS TO CONTAIN VOLUME OF RUNOFF, AND RECEEDING LIMB EQUAL TWICE THE RISING LIMB.



$$V_oL = 8816 \text{ AC} \cdot \text{FT} = \frac{1}{2} Q_p D$$

$$D = \frac{8816 \text{ AC} \cdot \text{FT}}{0.5(5655 \text{ CFS})}$$

$$= \frac{8816 \times 42.560 \text{ FT}^2/\text{AC}}{0.5(5655 \text{ CFS}) \times 60 \text{ MIN}/\text{HR} \times 60 \text{ SEC/MIN}} = 37.7 \text{ HR.}$$

SAY $T_p = 12.5 \text{ HOURS}$, $D = 37.5 \text{ HOURS}$



FORM INFLOW TRIANGULAR HYDROGRAPH

$$Q_p = 11310 \text{ CFS}$$

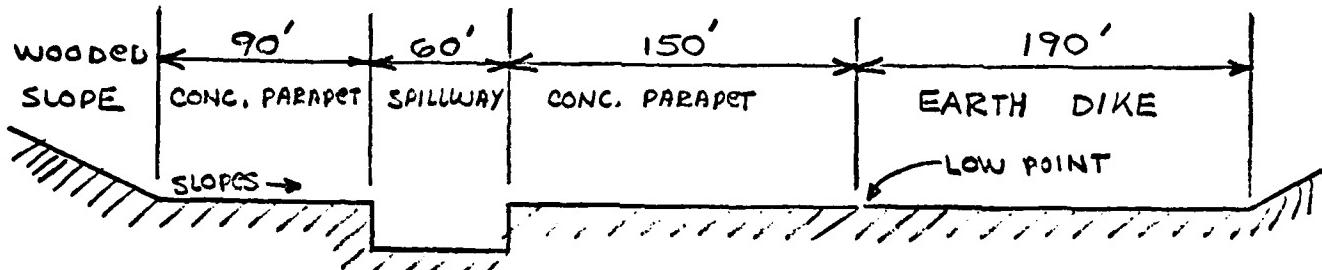
$$T_p = 12.5 \text{ HOURS}$$

$$D = 37.5 \text{ HOURS}$$

TIME <u>HOURS</u>	INFLOW <u>CFS</u>
0	0
2	905
4	1810
6	2715
8	3620
10	4525
12	5420
12.5	5655
13.0	5542
14.	5316
16	4863
18	4411
20	3958
22	3506
24	3054
28	2149
32	1244
36	339
37.5	0



SPILLWAY AND OVERFLOW SECTION DATA



<u>SEGMENT</u>	<u>ITEM</u>	<u>"C"</u>	<u>LENGTH</u>	<u>ELEV.</u>
1	CONC PARAPET	2.8	90'	111.0
2	SPILLWAY	3.0	60'	102.0
3	CONC PARAPET	2.8	150'	111.0
4	EARTH DIKE	2.5	190'	111.0

NOTE THAT THE CONCRETE PARAPETS HAVE
CHAIN LINK FENCES ON THEM.

SURCHARGE STORAGE

ELEV.	OVERTOPPING HEIGHT	STORAGE
111.46	0.46'	3 acre-feet

MAD RIVER DAM WTBY 1/2 PM/F 79-90-10

FLOOD ROUTING

12/20/79

INPUT DATA:
 SEGMENT 1
 SEGMENT 2
 SEGMENT 3
 SEGMENT 4
 IE=102.0 IV=

UNSUBMERGED WEIR
 DISCHARGE COEFFICIENT = 2.8 LENGTH OF WEIR = 90
 DISCHARGE COEFFICIENT = 3.0 LENGTH OF WEIR = 60
 DISCHARGE COEFFICIENT = 2.8 LENGTH OF WEIR = 150
 DISCHARGE COEFFICIENT = 2.5 LENGTH OF WEIR = 190
 0.0 E=102.0 A= 6.00 E=120.0 A= 6.00

HOUR	INFLOW	MASS INFLOW	WATER EL.	TAIL WATER	OUTFLOW MASS	OUTFLOW	STORAGE (R)	STORAGE (A)
0.00	0CFS	0.00AC-F	102.00FT	• 00FT	0CFS	0.00AC-F	0.00AC-F	0.00AC-F
2.00	905CFS	74.79AC-F	104.52FT	0.00FT	721CFS	59.64AC-F	15.14AC-F	15.14AC-F
4.00	1,810CFS	299.17AC-F	106.70FT	0.00FT	1,835CFS	270.96AC-F	28.21AC-F	28.21AC-F
6.00	2,715CFS	673.14AC-F	107.93FT	0.00FT	2,600CFS	637.54AC-F	35.59AC-F	35.59AC-F
8.00	3,620CFS	1,196.69AC-F	109.40FT	0.00FT	3,627CFS	1,152.26AC-F	44.43AC-F	44.43AC-F
10.00	4,525CFS	1,869.83AC-F	110.47FT	0.00FT	4,439CFS	1,818.99AC-F	50.84AC-F	50.84AC-F
12.00	5,420CFS	2,691.73AC-F	111.37FT	0.00FT	5,439CFS	2,635.45AC-F	56.27AC-F	56.27AC-F
12.50	5,655CFS	2,920.55AC-F	111.46FT	0.00FT	5,610CFS	2,863.75AC-F	56.80AC-F	56.80AC-F
13.00	5,542CFS	3,151.90AC-F	111.45FT	0.00FT	5,589CFS	3,095.15AC-F	56.74AC-F	56.74AC-F
14.00	5,316CFS	3,600.57AC-F	111.29FT	0.00FT	5,291CFS	3,544.78AC-F	55.79AC-F	55.79AC-F
16.00	4,863CFS	4,441.81AC-F	111.04FT	0.00FT	4,906CFS	4,387.55AC-F	54.26AC-F	54.26AC-F
18.00	4,411CFS	5,208.26AC-F	110.43FT	0.00FT	4,411CFS	5,157.63AC-F	50.62AC-F	50.62AC-F
20.00	3,958CFS	5,899.91AC-F	109.89FT	0.00FT	3,996CFS	5,852.52AC-F	47.39AC-F	47.39AC-F
22.00	3,506CFS	6,516.77AC-F	109.25FT	0.00FT	3,514CFS	6,473.26AC-F	43.50AC-F	43.50AC-F
24.00	3,054CFS	7,058.92AC-F	108.65FT	0.00FT	3,088CFS	7,019.00AC-F	39.91AC-F	39.91AC-F
28.00	2,149CFS	7,918.92AC-F	107.25FT	0.00FT	2,165CFS	7,887.42AC-F	31.50AC-F	31.50AC-F
32.00	1,244CFS	8,479.75AC-F	105.70FT	0.00FT	1,283CFS	8,457.51AC-F	22.23AC-F	22.23AC-F
36.00	339CFS	8,741.40AC-F	103.62FT	0.00FT	374CFS	8,731.62AC-F	9.77AC-F	9.77AC-F
37.50	OCFS	8,762.41AC-F	102.53FT	0.00FT	70CFS	8,759.20AC-F	3.20AC-F	3.20AC-F

D-7

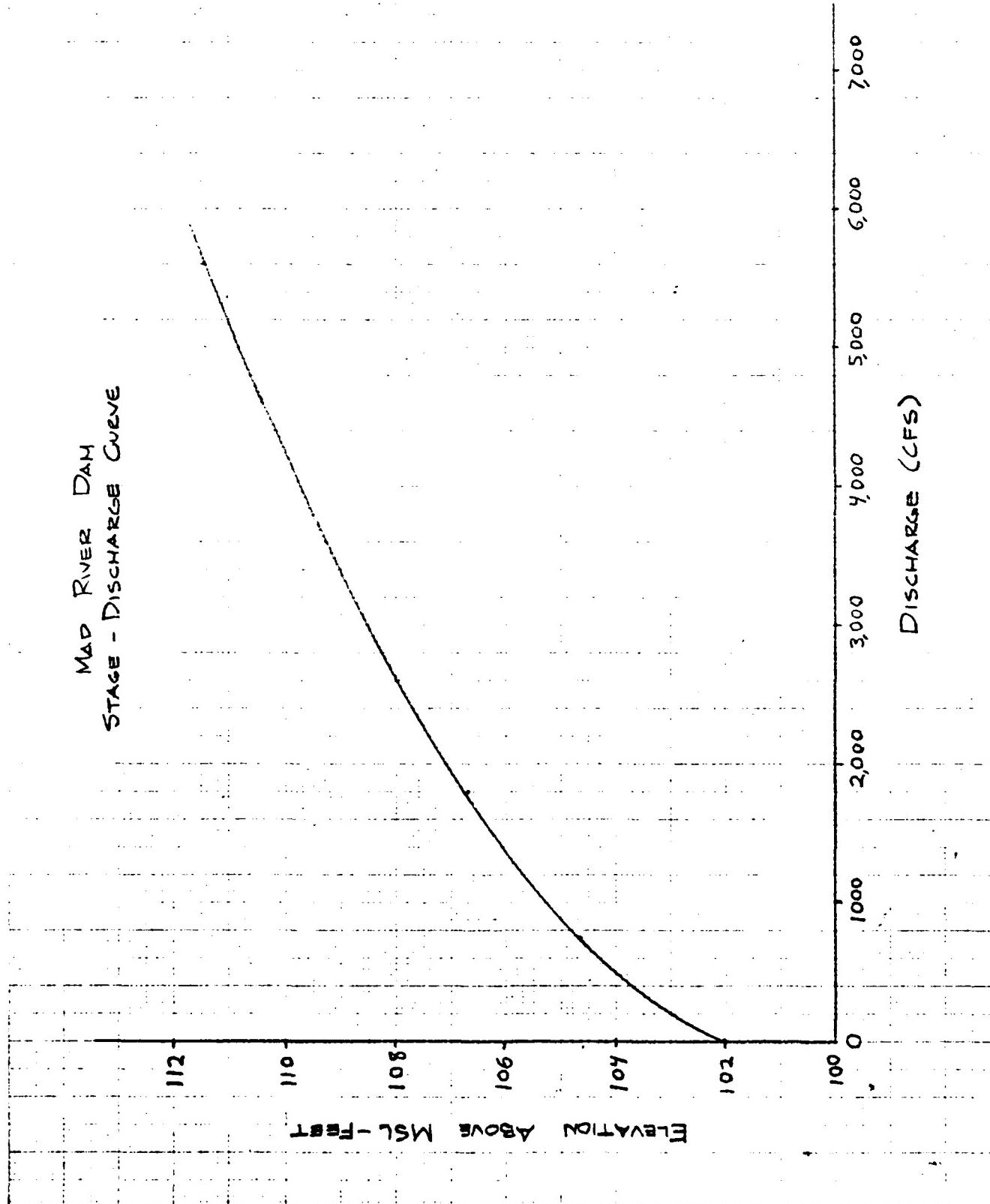
PROJECT
MAD RIVER DAM



FLAHERTY-GIAVARA ASSOCIATES
ENVIRONMENTAL DESIGN CONSULTANTS
ONE COLUMBUS PLAZA, NEW HAVEN, CONN 06510/203/789-1260

SHEET NO. OF
BY DKS DATE 12/14/79
CHK'D. BY PB DATE 12/14/79

MAD RIVER DAM
STAGE - DISCHARGE CURVE

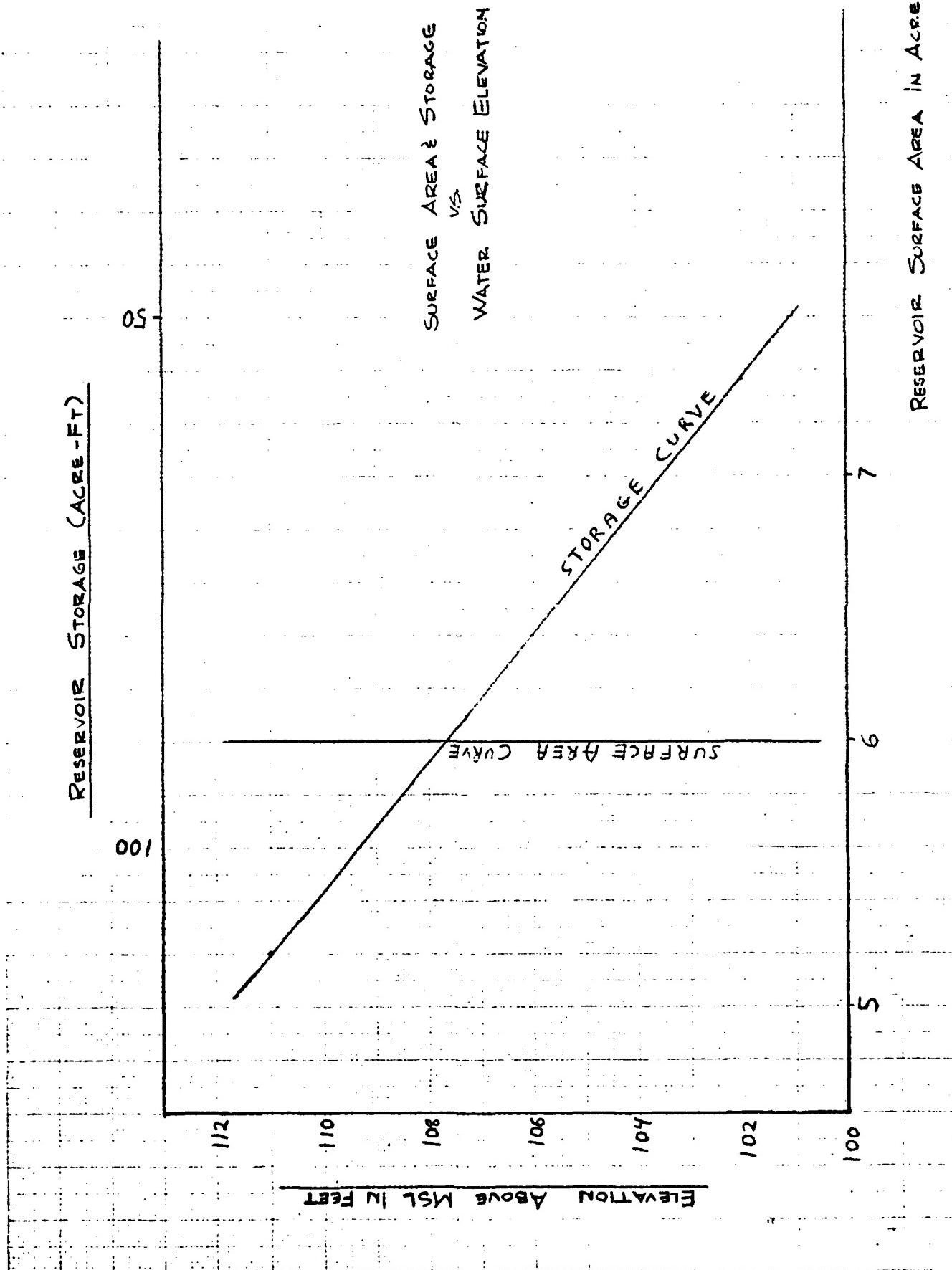


PROJECT
MAD RIVER DAM



FLAHERTY-GIAVARA ASSOCIATES
ENVIRONMENTAL DESIGN CONSULTANTS
ONE COLUMBUS PLAZA, NEW HAVEN, CONN. 06510/203/789-1260

SHEET NO. 10 OF 10
BY DKS DATE 12/14/79
CHK'D. BY PB DATE 12/14/79



MAD RIVER DAM

WTBY JGM 11/28/79

FGA FLOOD WAVE ROUTING

APPROXIMATE FLOOD WAVE ROUTING BASED UPON U.S. ARMY CORPS
OF ENGINEERS' "RULE OF THUMB GUIDANCE FOR ESTIMATING
DOWNSTREAM DAM FAILURE HYDROGRAPHS" DATED APRIL, 1978.

INITIAL STATION = 0 +0
INITIAL WAVE HEIGHT = 32.0 FT
ASSUMED BREACH WIDTH = 60.0 FT
INITIAL RESERVOIR STORAGE = 110 ACRE-FT
COMPUTED FLOOD WAVE PEAK FLOW = 18,249 CFS

STATION 0+90

OFFSET	ELEV.	OFFSET	ELEV.	OFFSET	ELEV.
-190.0 FT	450.0 FT	-120.0 FT	430.0 FT	-15.0 FT	425.0 FT
-15.0 FT	425.0 FT	-10.0 FT	420.0 FT	10.0 FT	420.0 FT
15.0 FT	425.0 FT	90.0 FT	430.0 FT	190.0 FT	450.0 FT
420.0 FT	480.0 FT	650.0 FT	500.0 FT		

N = 0.070
N = 0.040
N = 0.070

AREA	WETTED PERIMETER	N	VELOCITY	FLOW
577.4 SF	115.5 FT	0.070	8.7 FPS	5,068CFS
360.8 SF	34.1 FT	0.040	25.3 FPS	9,132CFS
422.7 SF	89.7 FT	0.070	8.4 FPS	3,565CFS

INVERT	DEPTH	W. SURFACE	AREA	VELOCITY	FLOW	SLOPE
420.0 FT	12.8 FT	432.8 FT	1,361 SF	13.0 FPS	17,766 CFS	0.0200

STATION 8+50

OFFSET	ELEV.	OFFSET	ELEV.	OFFSET	ELEV.
-260.0 FT	430.0 FT	-220.0 FT	420.0 FT	-50.0 FT	410.0 FT

$$N = 0.070$$

-15.0 FT 410.0 FT

-15.0 FT	410.0 FT	-10.0 FT	405.0 FT	10.0 FT	405.0 FT
15.0 FT	410.0 FT				

$$N = 0.040$$

15.0 FT	410.0 FT	180.0 FT	410.0 FT	310.0 FT	430.0 FT
470.0 FT	440.0 FT	490.0 FT	450.0 FT	520.0 FT	460.0 FT

$$N = 0.070$$

AREA	WETTED PERIMETER	N	VELOCITY	FLOW
368.0 SF	117.3 FT	0.070	5.5 FPS	2,049CFS
270.0 SF	34.1 FT	0.040	18.0 FPS	4,878CFS
873.8 SF	196.8 FT	0.070	7.0 FPS	6,138CFS

INVERT	DEPTH	W. SURFACE	AREA	VELOCITY	FLOW	SLOPE
405.0 FT	9.8 FT	414.8 FT	1,511 SF	8.6 FPS	13,066 CFS	0.0150

STATION 15 +0

OFFSET	ELEV.	OFFSET	ELEV.	OFFSET	ELEV.
-700.0 FT	430.0 FT	N = 0.070		-10.0 FT	400.0 FT
-10.0 FT	400.0 FT	N = 0.040		20.0 FT	397.0 FT
25.0 FT	400.0 FT	0.0 FT	397.0 FT		
25.0 FT	400.0 FT	N = 0.080		200.0 FT	450.0 FT
400.0 FT	460.0 FT	60.0 FT	400.0 FT		

AREA	WETTED PERIMETER	N	VELOCITY	FLOW
857.1 SF	268.4 FT	0.070	4.6 FPS	3,946 CFS
306.1 SF	36.2 FT	0.040	15.3 FPS	4,713 CFS
280.7 SF	53.9 FT	0.080	5.5 FPS	1,565 CFS

INVERT	DEPTH	W. SURFACE	AREA	VELOCITY	FLOW	SLOPE
397.0 FT.	9.3 FT	406.3 FT	1,444 SF	7.0 FPS	10,225 CFS	0.0100

STATION 23 +0

OFFSET	ELEV.	OFFSET	ELEV.	OFFSET	ELEV.
-480.0 FT	400.0 FT	-10.0 FT	390.0 FT		$N = 0.050$
-10.0 FT	390.0 FT	0.0 FT	387.0 FT	10.0 FT	390.0 FT
10.0 FT	390.0 FT	50.0 FT	400.0 FT	300.0 FT	410.0 FT
480.0 FT	450.0 FT	830.0 FT	500.0 FT		$N = 0.040$

AREA	WETTED PERIMETER	N	VELOCITY	FLOW
894.5 SF	290.0 FT	0.050	6.2 FPS	5,633CFS
153.3 SF	20.8 FT	0.040	14.0 FPS	2,153CFS
76.1 SF	25.4 FT	0.070	4.4 FPS	335CFS

INVERT	DEPTH	W. SURFACE	AREA	VELOCITY	FLOW	SLOPE
387.0 FT	9.1 FT	396.1 FT	1,124 SF	7.2 FPS	8,122 CFS	0.0100

STATION 31 +0

OFFSET	ELEV.	OFFSET	ELEV.	OFFSET	ELEV.
		$N = 0.070$			
-1120.0 FT	400.0 FT	-590.0 FT	390.0 FT	-480.0 FT	380.0 FT
-15.0 FT	380.0 FT				
		$N = 0.040$			
-15.0 FT	380.0 FT	-10.0 FT	375.0 FT	10.0 FT	375.0 FT
15.0 FT	380.0 FT				
		$N = 0.070$			
15.0 FT	380.0 FT	350.0 FT	380.0 FT	430.0 FT	400.0 FT
570.0 FT	450.0 FT				

AREA	WETTED PERIMETER	N	VELOCITY	FLOW
783.9 SF	483.2 FT	0.070	2.9 FPS	2,297CFS
174.6 SF	34.1 FT	0.040	11.0 FPS	1,925CFS
559.4 SF	341.8 FT	0.070	2.9 FPS	1,649CFS

INVERT	DEPTH	W. SURFACE	AREA	VELOCITY	FLOW	SLOPE
375.0 FT	6.6 FT	381.6 FT	1,518 SF	3.8 FPS	5,872 CFS	0.0100



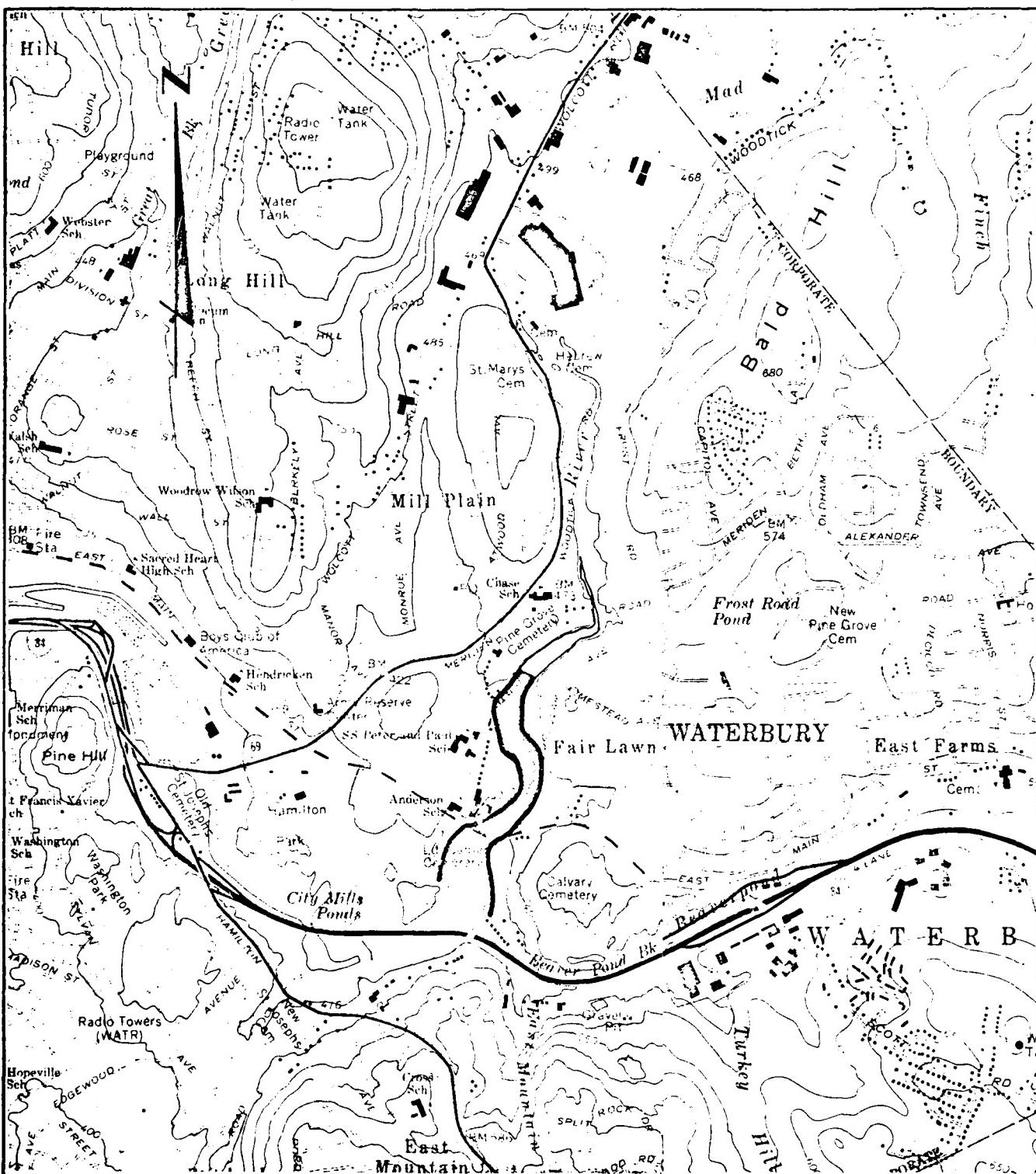
MAD RIVER DAM

DRAINAGE MAP

WATERBURY, CONNECTICUT

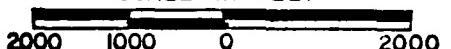
SCALE IN MILES

2 1 0 2



MAD RIVER DAM
DAM FAILURE ANALYSIS
IMPACT AREAS
WATERBURY, CONNECTICUT

SCALE IN FEET


 2000 1000 0 1000 2000

APPENDIX E

INFORMATION AS CONTAINED IN THE
NATIONAL INVENTORY OF DAMS

INVENTORY OF DAMS IN THE UNITED STATES

STATE COUNTY DIVISION COUNTRY
 STATE COUNTY DIST. STATE COUNTY DIST.
 CT. 500 009 05

NAME		LATITUDE NORTH	LONGITUDE WEST	REPORT DATE DAY MO YR
MAD RIVER DAM		4132.9	7300.4	16 JAN 60

POPULAR NAME

HOMESTEAD AVENUE DAM

RIVER BASIN	RIVER OR STREAM	NEAREST DOWNSTREAM CITY-TOWN-VILLAGE	FED. DAM (MIL.)	POPULATION
0110	MAD RIVER	WATERBURY	2	113900

TYPE OF DAM	YEAR COMPLETED	PURPOSES	MAXIMUM HEAD (FT.)	IMPOUNDING CAPACITIES (ACRE-FT.)	DIST. OWN FED H PRV/FED SCS A VER/DATE
STRUCTURE	1900	K	31	24	50 NED N N N N

REMARKS

22-E STIMATE

D.S.	SPILLWAY MAX. HEAD IN FEET	MAXIMUM DISCHARGE (CFS)	VOLUME OF DAM (CY)	POWER CAPACITY INSTALLED (MW)	NAVIGATION LOCKS
1	490	60	4,600		

OWNER

JOHN ENRICHETTI ASS

CONSTRUCTION BY

ENGINEERING BY

REGULATORY AGENCY

OPERATION

MAINTENANCE

INSPECTION BY

AUTHORITY FOR INSPECTION

REMARKS

REMARKS

FLAMERTY GIavarA ASSOCIATES

PL 92-367



SEARCHED

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